Smart Life Forum

Dr. Thomas Levy

Vitamin C: Electrons, Toxins and Disease

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Meet Dr. Thomas Levy

Dr. Levy received his Bachelor of Arts degree in biology from the Johns Hopkins University in 1972. He later graduated from the Tulane University School of Medicine in 1976. Continuing his training at Tulane, he specialized first in internal medicine and then in cardiology, receiving board certification in both of these disciplines. After completing his postgraduate training, Dr. Levy served as an assistant professor of medicine at Tulane Medical School for another three years. After a private practice of adult cardiology, Dr. Levy started his research on the medical impact of dental toxicity with Dr. Hal Huggins in 1994. In 1998, he received his law degree from the University of Denver and was subsequently admitted to practice law in Colorado and the District of Columbia.

Vitamin C, Infectious Diseases, and Toxins is Dr. Levy's fourth book. His previous books are *Uninformed Consent: The Hidden Dangers in Dental Care*, co-authored with Dr. Huggins; *The Roots of Disease: Connecting Dentistry and Medicine,* co-authored with Robert Kulacz, D.D.S.; and *Optimal Nutrition for Optimal Health*. For further information on Dr. Levy, you can review his curriculum vitae on the web at www.TomLevyMD.com

ELECTRONS, TOXINS, AND DISEASE

Many scientific phenomena, perhaps a majority of them, ultimately obey or follow fairly simple laws of nature, once discovered and understood. The scientific concepts we understand the least are often cloaked in the most complex of language and theories. When any scientist cannot clearly explain his or her research to a layperson unschooled in that area, there usually exists a corresponding lack of complete understanding by that scientist. One can research the outer layer of an onion indefinitely without having any understanding of what is going on several layers deeper. Yet the onion as a whole can remain a mystery even though mountains of research data might have been generated on the outer layer.

While researching thousands of articles over the last few years in the preparation of his latest book on vitamin C (Levy, 2002), interesting patterns began to emerge. Even though the effects of vitamin C on over 25 different infectious diseases and over 100 different toxins were examined, common mechanisms of action became apparent. This was especially significant since he had long wondered how a single chemical entity (ascorbate, or vitamin C) could have such dramatically positive clinical effects on such a wide array of completely unrelated chemical compounds and infectious agents. Quite literally, there seemed to be no exceptions to this vitamin C effect. Even if vitamin C did not cure a given infection or toxic state, it always helped resolve such a condition to some degree.

Dr. Albert Szent-Gyorgyi, the brilliant scientist who won the Nobel Prize in 1937 for his discovery of vitamin C, also advanced what Dr. Levy would call a true theory of life in two of his last publications. Szent-Gyorgyi (1978, 1980) asserted that energy exchange in the body can only occur when there is an imbalance of electrons among different molecules, assuring that electron flow must take place. Natural electron donators give up electrons to natural electron acceptors. Szent-Gyorgyi maintained that dead tissue had a full complement of electrons, a state in which no further exchange or flow of electrons could take place. Another way of viewing this is that brisk electron flow and interchange equals health, impaired or poor electron flow and interchange equals disease, and cessation of flow and interchange equals death. Vitamin C, as the premier antioxidant in the body, is perhaps the most important ongoing electron donor to keep this electron flow at optimal levels.

Oxidation involves the loss of electrons, and an antioxidant counters this process by

supplying electrons. Although vitamin C is the most important antioxidant in the body, there are many different antioxidants present in the body, and many of them work to keep the more important antioxidant substances in the body in the reduced state, which allows the donation of electrons. For example, vitamin E is an antioxidant that is fat soluble, which is important in allowing it to be the primary antioxidant present in the lipid-rich cell membranes of the body. Vitamin C, which is water soluble, helps to recharge oxidized vitamin E in those cell membranes back to the electron-rich reduced form. Even though vitamin C is not the primary antioxidant in the cell wall, it plays a vital role in maintaining the optimal levels of the metabolically active antioxidant, vitamin E, at that site.

It appears, then, that the local loss of electrons (oxidation) represents the primary degeneration, or metabolic breakdown, of the tissue or chemical substance losing the electrons. An antioxidant can serve to immediately restore this loss of electrons, resulting in a prompt "repair" of that acutely oxidized tissue. Also, an antioxidant can often neutralize the oxidizing agent before it gets a chance to oxidize, or damage, the tissue initially.
All of the vitamin C/toxin exposure studies reviewed showed one or more of the following findings or consequences in the test tube, tissue, intact animal, or human studied:

1. Decreased levels of vitamin C and other antioxidants (blood and/or the tissues most specifically affected)
2. Increased levels of oxidative stress in the test setting, indicating ongoing oxidation
3. Increased liver production of vitamin C (in those species capable of this), as an adaptive response
4. Increased rates of consumption of vitamin C and other antioxidants
5. A direct correlation between toxin activity and antioxidant levels (lower antioxidant levels, greater clinical toxicity)
6. The acute induction of scurvy or other clinical findings consistent with the acute depletion of vitamin C

It is important to reemphasize that the above findings were always part of the toxin exposure situation regardless of the chemical structure of the toxin. One conclusion that can be reached from this information is simple, elegant, and very compelling:

All toxins poison by oxidizing enzymes and tissues. There is also a compelling conclusion generated by this observation and supported by the vitamin C studies found in the scientific literature:
All toxic damage can be repaired by a high enough dose of antioxidants.

Of course, such therapy must be given in a timely fashion, before irreversible clinical consequences have occurred in the poisoned subject. Interestingly, infectious diseases inflict their damage in essentially the same way as toxins. As virulent microbes grow inside a host, one or more of the same six findings as already listed above will reliably be observed. Basically, microbial growth is just another way to directly cause oxidative damage to the tissues most directly involved. Some of the most devastating infectious diseases also produce potent toxins that further increase the oxidative damage and stress to the infected host.

Chronic disease can be viewed as a process in which the oxidative stress proceeds at a much slower pace than is seen with acute infectious diseases and acute toxin exposures. Vigorous antioxidant therapy goes a long way in reversing the clinical manifestations of such diseases as well, as long as the dose administered supplies enough electrons on a daily basis to reverse the ongoing oxidative damage from the disease process. Unipolar magnetic therapies probably affect electron delivery to an injured site as well.

Electricity is considered the flow of electrons. Putting a magnetic field in motion will induce electricity. Electron flow would appear to be intimately involved in the physical and biological effects of magnetism. The work of Davis and Rawls (1975, 1979) established that a North pole magnetic exposure decreased inflammation and pain, while suppressing microbial growth. The South pole had the opposite biological effects. One possible explanation for these findings is that a North pole magnetic field facilitates the delivery of electrons into exposed tissue, while the South pole facilitates the transport of electrons away from exposed tissue. Regardless, the proper use of the North pole of a strong biomagnet closely mimics the effects of vitamin C delivered systemically. Kulish (1999) summarizes the effects of such biomagnetic therapies nicely. Is compromised electron flow the final common denominator in producing the symptoms and effects of most (or all) diseases, infections, and toxin exposures? Regardless of the answer, the vigorous and persistent dosing of antioxidant therapy, as discussed and researched in his new vitamin C book, appears to deliver consistently positive and dramatic clinical outcomes.

Dental Toxicity for very many people, toxins from dental sources are their biggest long-term immune challenges. Root canals, mercury fillings, cavitations, dental implants, periodontal disease, toxic dental materials, and a vital or infected teeth due to any underlying cause can often be the source of enormous toxicity for a given patient. Many motivated people who do a large number of positive things to promote good health will remain frustrated and sick if their dental toxicity remains unaddressed. Dr. Levy has

written extensively on dental toxicity issues, including the best ways he has found to support good immune function. Even if someone does not want to address the issue of dental toxicity directly, optimal nutrition and optimal supplementation are, unfortunately, complex topics that must be addressed correctly if they are to serve as supporters of good health and good immune function. Some common diets perceived as being good, along with misguided supplementation, can actually worsen one's health. Even if dental toxins remain unaddressed, optimal nutrition and proper supplementation can promote improved health.

BIOTERRORISM: BEYOND VACCINATIONS AND ANTIBIOTICS

The idea of an untreatable, killer epidemic sweeping across the nation is certainly frightening. However, he will attempt to show that our treatment options might not be as bleak or limited as they might seem to be. Consider some of the known information about anthrax and smallpox, which are perhaps two of the most significant bioterrorism agents. ANTHRAXAnthrax is a bacterial disease that occurs primarily in one of four forms: cutaneous (skin), inhalation (lung), gastrointestinal, and oropharyngeal (mouth and throat). It is readily transmissible in a spore form that readily germinates into growing bacteria when a receptive host environment is encountered.

So far the only two forms of this disease resulting from the postal attacks have been cutaneous and inhalation. The cutaneous form of anthrax can occur on any exposed skin surface, progressing eventually to a blackened, ulcerated lesion. The blackened appearance of this lesion accounts for the name "anthrax," which comes from the Greek word for coal. Untreated, it can result in death about 25% of the time. When treated with antibiotics death is rare. Except in the context of a widespread bioterrorist attack, inhalation anthrax is extremely difficult to diagnose. The incubation period can range from 1 to 6 days, initially presenting with flu-like symptoms. The next phase of the disease can proceed very rapidly to death after lung symptoms present. Difficulty breathing, coughing up blood, chest pain, and profuse sweating are common symptoms at this point. The infection then proceeds to a blood poisoning that will further proceed rapidly to death even if antibiotic therapy is finally initiated.

Although anthrax appears to be treatable by antibiotics in the early stages of the disease, the advanced inhalation form of this disease will typically not respond to such therapy, and death will result. An anthrax vaccine has been developed, but it is really only available to the military at this time. Furthermore, we are told that purified, antibiotic-resistant forms of anthrax for military use exist. Fortunately, such forms of anthrax do not yet appear to

have been disseminated in any fashion. Inhalation anthrax is especially deadly because of its rapid progression after the initial lung symptoms appear. This is largely due to the fact that anthrax is an infection that not only grows, but also produces potent toxins. In fact, the coughing up of blood is a reliable indicator that the toxins are being produced in critical amounts deep in the lungs. T
he antibiotic therapy for the anthrax organism has no effect on bacterial toxins that have already been produced. Antitoxin therapy, a treatment intended to neutralize a toxin, was tried in the past, but this therapy is not currently available. Interestingly, the 21st edition of the Cecil Textbook of Medicine, copyright 2000, considers penicillin as the drug of choice for anthrax. Cipro (ciprofloxacin), which is currently being highly touted in the news, is listed along with a number of other antibiotics as being indicated primarily for the treatment of anthrax victims who are allergic to penicillin. However, ciprofloxacin and doxycycline are the antibiotics commonly recommended when there is a known or suspected exposure. More recently, doxycycline is being promoted as the oral prevention antibiotic of choice, in the hopes that any antibiotic-resistant microbes that eventually result might then be susceptible to ciprofloxacin.

SMALLPOX

Smallpox, a deadly viral disease, is also being mentioned as a leading candidate for another bioterrorist attack. The established therapy available for smallpox is to vaccinate before infection or fairly early after infection. Immune globulin therapy is also available to hopefully lessen the degree of infection and resulting illness. If these measures fail, supportive therapy is the only remaining traditional option. Either the patient's immune system eventually wins, or the patient dies. Furthermore, the patients who are fortunate enough to survive face significant skin scarring after the characteristic skin lesions finally resolve. Smallpox is considered a significant threat as it has a case-fatality rate of 30% or more among unvaccinated persons. Furthermore, since routine smallpox vaccination ceased in the United States more than 25 years ago, the degree of continuing protection from very old vaccinations against contracting smallpox now is less than clear. Some experts feel the protection is largely gone (Henderson et al., 1999). The ability of smallpox to be a potent biological weapon was already demonstrated long ago. During the French and Indian Wars from 1754 to 1767 British forces in North America were able to initiate smallpox epidemics among the American Indians (Stearn and Stearn, 1945). Blankets used by smallpox victims eventually reached the Indians, and death rates exceeding 50% were seen after some of the tribes were successfully infected. The smallpox patient is most infectious to others from the onset of the characteristic rash through the next 7 to 10 days (Mack, 1972; Mack et al., 1972). This rash is preceded by high fever and a symptom

complex that could certainly be confused with the flu. Especially progressive smallpox infections can result in widespread hemorrhage and death within only 5 to 6 days of the onset of the rash. Smallpox vaccinations are not without risk (Lane et al., 1969). Encephalitis (brain inflammation), severe skin rashes, and even a progressive, sometimes fatal, infection directly resulting from the inoculation can all occur. A non-toxic alternative to this vaccination would be highly desirable. The current rareness of both anthrax and smallpox is highlighted by the fact that the 2001 edition of *Conn's Current Therapy* does not even mention either of these diseases. Few physicians have any first-hand clinical experience in the treatment of these diseases.

TREATMENT ALTERNATIVES

Vitamin C, typically as ascorbic acid or sodium ascorbate, should prove to be highly effective against both of these conditions. He says "should" only because their rareness has prevented any single vitamin C researcher from encountering enough cases to conduct a meaningful study and publish it. However, the likelihood that both of these conditions could be completely cured, even in their advanced stages, is compelling.

Consider the following information: **The medical literature has clear documentation that high enough doses of injectable vitamin C are almost always effective in curing any of a number of viral infections still considered today to be incurable.**

Klenner (1949) completely cured 60 out of 60 cases of infantile polio in North Carolina in the middle of a polio epidemic. Several infants already had neurological involvement, but nevertheless recovered completely. Klenner (1951) was also able to bring about a complete recovery by administering enough vitamin C to one five year-old polio victim who had already been paralyzed in both legs for over four days. Klenner (1949, 1953, 1971, and 1974) also reported the repeated ability to rapidly cure viral diseases such as encephalitis (often presenting in the comatose state), herpes infections, acute hepatitis, measles, and mumps.

Klenner found that his only inadequate responses to treatment were overcome by increasing the vitamin C dose and/or going from an oral to an injectable form of vitamin C. Cathcart (1981) also reported an incredible success in the treatment of many viral diseases for which no specific anti-viral agents exist today. Of particular interest, he reported that he never had a case of viral hepatitis fail to respond to intravenous vitamin C. Furthermore, he never observed a single case of acute hepatitis treated appropriately

with vitamin C to persist long enough to evolve to the status of chronic hepatitis. Finally, although no specific studies looking at the effects of vitamin C on smallpox could be found, Kligler and Bernkopf (1937) were able to determine that relatively small doses of vitamin C could easily kill the vaccinia virus, which is the virus in the vaccine that induces immunity to smallpox.

Vitamin C has also been documented to rapidly resolve a number of non-viral infectious diseases that do not readily resolve in the absence of vitamin C therapy. Diptheria (Klenner, 1949 and 1971), whooping cough (Otani, 1936 and 1939; Ormerod et al., 1937), and tetanus (Klenner, 1954) all have responded very well to vitamin C. Of great interest as well is that all three of these infections are associated with very significant microbe-generated toxins, much like anthrax. Jungeblut and Zwemer (1935) found that vitamin C both inactivated diphtheria toxin in the test tube and protected guinea pigs against the fatal outcome of being injected with otherwise fatal doses of diphtheria toxin. Dey (1966) showed that enough injected vitamin C would completely protect rats from otherwise fatal doses of tetanus toxin.

Klenner never encountered a virus he could not cure, although he used doses of vitamin C that are considered outrageously high today, even though such doses are nevertheless decidedly non-toxic. His initial dosing of vitamin C would go as high as 700 mg/kg body weight, which could exceed 70 grams for a large man. Furthermore, he would repeat this high dosing in only a few hours if no drop in fever or clear clinical improvement resulted. He never reported any toxicity from vitamin C dosed in this fashion. However, he repeatedly reported that initially unresponsive patients did finally respond when enough vitamin C was administered frequently enough. From the very current scientific literature we know that 60 grams of vitamin C can be repeatedly infused without toxicity over only an 80-minute period. Furthermore, 50-gram intravenous doses of vitamin C can be given daily for 8 weeks without any side effects other than improved health (Casciari et al., 2001). His own clinical experiences with intravenous vitamin C infusions allowed him to completely believe all of the data that Klenner and others have accumulated.

Many feel vitamin C did not deliver as promised when Linus Pauling’s recommendations of a few grams of vitamin C a day did not end up curing or completely preventing the common cold. To be sure, it did make those infected feel better, and it shortened the durations of their symptoms. It did also lessen the likelihood of getting a cold. Once entrenched in the body, however, the common cold results in a very high titer of virus particles. A few grams of vitamin C will help the immune system cope, but it is not remotely enough to promptly eradicate the virus load present. However, several hundred grams of

vitamin C intravenously daily for 2 to 3 days can be expected to knock out the common cold in most people. The next time you have already been sick with a cold for a few weeks, you will appreciate what a remarkable clinical response this is.

After determining your best daily dose of vitamin C by following the bowel tolerance method outlined by Cathcart (1981) and after taking that daily dose regularly, the likelihood of contracting any infectious disease, anthrax and smallpox included, is remote. For many people, this will translate to a total daily dose of vitamin C of 8 to 15 grams taken in divided doses, although some people will require more. The recommended form of vitamin C would be sodium ascorbate, although ascorbic acid would be perfectly acceptable.He does not recommend high doses of calcium ascorbate. If you are exposed to a very high dose of infectious organisms, the maintenance doses of vitamin C noted above can be overwhelmed and clinical infection can still result. The simple answer then is to start vitamin C infusions at up to 700 mg/kg at a time as often as is necessary to obtain a positive clinical response. Lesser amounts and less frequent dosing can be used if the clinical picture is not severe. Obviously, the administration would have to be very vigorous in an inhalation anthrax patient who has already developed lung symptoms and death may be only hours to a day or two away. Certainly, in the case of anthrax, there is no reason not to take all prescribed antibiotics as well, but the antibiotics will have little effect if large amounts of anthrax toxin have already been produced. The vitamin C would be essential at that point.

In viral diseases where bleeding complications occur, the bleeding will often occur at those sites in the body where vitamin C levels are lowest, or even nonexistent. It is absolutely characteristic for such "focal" sites of scurvy to hemorrhage, and nothing short of very large doses of vitamin C given very quickly can be expected to save the patient at that point.

Regardless of any skepticism toward such high-dose vitamin C therapy, it is absolutely unthinkable not to try it or add it to whatever protocol is being administered to the patient. At the very least, all acute infectious diseases rapidly metabolize vitamin C, and all acutely ill patients are consequently deficient in vitamin C. The administration of vitamin C should always be undertaken when acute vitamin C deficiency is a certainty, even if one does not believe that enough vitamin C can be a definitive therapy by itself. Hydration is also extremely important, both in health and disease. Furthermore, vigorous hydration (2 to 4 quarts of water daily) will augment the effectiveness of the vitamin C therapy. Just about the only time high doses of vitamin C can cause problems is if the patient is not kept very well hydrated.

Remember that patients with high fever lose body water rapidly. Most other medicines have more side effects in the face of dehydration as well. There are many other supplements and nutrients that can augment the anti-microbial effects and immune-bolstering effects of vitamin C, which is beyond the scope of this newsletter. Just don't neglect the most important one: vitamin C.