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The High pH Therapy for Cancer: Tests on Mice and Humans

plus other papers

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1. ABSTRACT

Brewer, A. K. "The high pH therapy for cancer tests on mice and humans." *Pharmacology, Biochemistry and Behavior* v.**21**: Suppl. 1, 1-5. 1984. -- Mass spectrographic and isotope studies have shown that potassium, rubidium, and especially cesium are most efficiently taken up by cancer cells. This uptake was enhanced by Vitamins A and C as well as salts of zinc and selenium. The quantity of cesium taken up was sufficient to raise the cell to the 8 pH range, where cell mitosis ceases and the life of the cell is short. Tests on mice fed cesium and rubidium showed marked shrinkage in the tumor masses within 2 weeks. In addition, the mice showed none of the side effects of cancer. Tests have been carried out on over 30 humans. [Please note: these tests were not conducted by Dr. Brewer.] In each case the tumor masses disappeared. Also all pains and effects associated with cancer disappeared within 12 to 36 hr; the more chemotherapy and morphine the patient had taken, the longer the withdrawal period. Studies of the food intake in areas where the incidences of cancer are very low showed that it met the requirements for the high pH therapy.

The High pH Therapy for cancer was arrived at from an extensive series of physical experiments. These involved the isotope effect across membranes of many types, normal plant and animal, embryonic, cancer, and synthetic. It also involved mass spectrographic analyses of membranes and cells, as well as fluorescence and phosphorescence decay studies of many types of cells and parts thereof. It is the thesis of this paper that the results obtained throw a direct light upon the mechanism of carcinogenesis, and also indicate a therapy. Tests on both mice and humans substantiate this theoretical approach [1-8].

2. BACKGROUND

The isotope effect throws a very direct light on the mechanism of carcinogenesis. In this study it was shown that the $^{39}K/41K$ ratio in ocean water down to 6000 ft was 14,20000 [9-11]. In normal matured cells, both plant and animal, the ratio varied from 14.25 to 14.21. Embryonic and cancer cells all gave a ratio of 14.35. In the case of all synthetic cells across which there was a potential gradient, the ratio was 14.35. From these values it will be seen that the ratio in normal living cells indicates that as many isotopes leave the cell as enter.

In the case of potassium for embryonic and cancer cells as well as synthetic type cells with all types of membranes even including liquid mercury films the observed isotope ratio was given by equation 1.

$$\left(\frac{39K}{41K}\right)o = \left(\frac{39K}{41K}\right)n\,(41 + m / 39 + m)^{1/2} \quad (1)$$

where ***n*** refers to the normal ratio, ***o*** to the observed ratio, and ***m*** is the associated mass for the ions.

All cations in solution are associated. The attached mass for Cs^+ is 3 molecules of water, for Rb^+ it is 5 molecules, for K^+ is 7 molecules. For cations below potassium in the Electromotive Series all ions are highly associated. This is to be expected from their position in the Hoffmeister Series. In the case of Ca^{++} the association is 30 molecules, while Na^+ is 16. Equation (1) holds for all cations tested from $H^+$to U^+. The value of *m* however will vary when polar molecules are present in the solution. For example, K^+ can also attach glucose. In contrast, Ca^{++} can attach a wide variety of molecules; it is this cation that transports peroxides into the cell, as well as metabolic products out of the cell.

The results given in equation (1) are most significant in that they show that transport is dependent entirely upon the frequency with which the ions strike the membrane surface. It is not a matter of capillary action, but one on which the ion and its associated mass pass directly through the bonding space between molecules which comprise the membrane. That the associated molecules are not lost in this transport is due to the fact that the attraction between the molecules and the ion is far greater than their attraction by the material of the membrane.

In the case of potassium an exact similarity exists between embryonic and cancer cells. The isotope ratio indicates that the K^+ ions are taken up by the most efficient process possible. The same held true for Cs^+ and Rb^+.

In contrast to the above, a vast difference exists for cations below potassium in the EMS (Electro Magnetic Spectrum). In the case of embryonic cells all cations tested obeyed equation (1). In the case of cancer cells cations below potassium were taken up sparingly, if at all. For example the amount of calcium in cancer cells is only about one percent of that in normal cells [18].

The above isotope effect for potassium which transports glucose into the cell, and for calcium which transports oxygen are most significant with respect to cancer. They mean that glucose can readily enter cancer cells but that oxygen cannot enter. This accounts for the anaerobic state of cancer cells pointed out by Warburg as early as 1925 [26].

The mechanism responsible for the similarity in the isotope effect for potassium and rubidium in cancer and embryonic cells and for their marked difference in case of calcium was investigated in some detail using mass spectrographic analyses, and also fluorescence and phosphorescence decay patterns.

The phosphorescence decay patterns were found to be peculiar to and specific for all cell types or parts thereof [12-15]. It should be mentioned that the decay spectra is due entirely to the light emitted from the energized double bonds. All double bonds are capable of being raised to the energized state. While the fluorescence spectra and the phosphorescence decay patterns are both specific for each double bond

they can be influenced by adjacent strong polar radicals. Again, both can be completely depressed by molecules absorbed over the surface; thus morphine, as well as attached polycyclic type molecules, will completely depress the excitation of the P=O radicals which characterize all cell membrane surfaces.

The above results are most important with respect to membrane action. They show that the strong electron acceptors Cs^+, Rb^+, and K^+ can be attracted into the membrane so that they will enter the negative potential gradient which exists across all living membranes. In contrast to these cations, the highly associated cations farther down in the EMS are not sufficiently strong electron acceptors to be drawn into this gradient except when the P=O radicals are in the energized state. This means that K^+ cations which transport glucose into the cell can readily enter cancer cells, but that Ca^{++} ions which transport oxygen into the cell cannot enter. In the normal cell the glucose, upon entering the cell, reacts with the oxygen in the cell and is burned to carbon dioxide and water with the liberation of heat. This heat in turn is absorbed on the membrane surface and raises the P=O radicals to an energized state which permits them to attach more Ca^{++} ions. Thus it will be seen that the amount of oxygen entering the cell is determined by oxidation within the cell, primarily that of glucose. This action is responsible for the pH control mechanism of the cell which maintains a value near 7.35.

The reactivity of the double bond has been studied in some detail using both light absorption and electron impact. It was found that energy states of the order of those produced by metabolic processes were not reactive. In contrast, high energy states such as those that are induced by radioactivity. are very reactive. Intermediate energy states in the ultra violet range were not reactive. Intermediate energy states in the ultra violet range were not reactive by electron impact, but slightly with light quanta. Here however the reactivity increased with a high power of the energy intensity per unit area [16]. This suggests that the reactivity may be due to the multiple absorption of light quanta, thus raising the energy of the bond to the sum of the quanta absorbed (see Table 1).

TABLE 1

THE RELATIONSHIP BETWEEN REACTIVITY, DOUBLE BOND REACTIVITY, INTERMEDIATE ENERGY STATES, WAVE LENGTH AND RADIATION

Volts Ve=h $\times 1.235 \times 10^X$	Wave Length Å	Radiation	Reactivity
10^{-4}	1 cm	Rotation Spectra	
10^{-3}	10^7 Å	Infra	Zero
10^{-2}	10^6 Å	Red	
10^{-1}	10^5 Å	Solar	Zero
1	10^4 Å	Ultra Violet	
10	10^3 Å		Low
10^2	10^2 Å	X-Rays	High
10^3	10 Å		
10^4	1 Å	Gamma	High
10^5	0.1 Å		
10^6	0.01 Å		

3. THE MECHANISM OF CARCINOGENESIS

The experimental information presented in the previous section involving the isotope effect, mass spectrographic analyses, and fluorescence and phosphorescence decay, combined with the pH data supplied by Von Ardenne [23-25], makes it possible to define the mechanism involved in carcinogenesis. This mechanism is very different from the accepted one of carcinogens entering the cell and becoming attached to the DNA. This mechanism will not explain any of the experimental data outlined briefly herein.

The proposed mechanism can be outlined in four steps.

Step 1 The attachment of carcinogenic type molecules to the membrane surface. This involves two factors: (a) the presence of carcinogenic-type molecules primarily of the polycyclic type, and (b) an energized state of the membrane, which may result from prolonged irritation. When these molecules are attached to the membrane glucose can still enter the cell, but oxygen cannot. The cell thus becomes anaerobic.

Step 2 In the absence of oxygen, the glucose undergoes fermentation to lactic acid. The cell pH then drops to 7 and finally down to 6.5.

Step 3 In the acid medium the DNA loses its positive and negative radical sequence. In addition, the amino acids entering the cell are changed. As a consequence, the RNA is changed and the cell completely loses its control mechanism. Chromosomal aberrations may occur.

Step 4 In the acid medium the various cell enzymes are completely changed. Von Ardenne has shown that lysosomal enzymes are changed into very toxic compounds. These toxins kill the cells in the main body of the tumor mass. A tumor therefore consists of a thin layer of rapidly growing cells surrounding the dead mass [3]. The acid toxins leak out from the tumor mass and poison the host. They thus give rise to the pains generally associated with cancer. They can also act as carcinogens.

4. HIGH AND LOW pH THERAPIES

Only two therapies will be mentioned here. Both are apparently effective. These are the Low pH therapy devised by Von Ardenne *et al*. [23-25] and the High pH therapy developed by the writer.

4.1. The Low pH Therapy

In this therapy devised by Von Ardenne, glucose is injected into the blood stream. As a consequence, the cancer cell pH will drop eventually to the 5.5 range. The patient is then placed in a furnace heated to 104 degrees Fahrenheit for a matter of hr [23-25]. The older the patient, the fewer the number of hours. The patient is allowed to breathe cold air. Diathermy is also applied over the tumor area which, in the absence of a blood supply, will cause the temperature of the mass to rise to something over 106 degrees Fahrenheit. At these high temperatures and in the acid medium, the life of cancer cells is very short. The only drawback to the therapy is that a case of severe toxemia may result from the out-leakage of the acid toxins within the tumor masses [23-25].

4.2. The High pH Therapy

The ready uptake of cesium and rubidium by the cancer cells lead the writer to the High pH therapy. This consists of feeding the patient close to 6 g of CsCl or RbCl per day in conjunction with the administration of ascorbic and retionic acids, Vitamins C and A, which being weak acids, upon absorption by the tumor cells will enhance the negative potential gradient across the membrane, and also zinc and selenium salts which, when absorbed on the membrane surface, will act as broad and moderately strong electron donors. Both types of compounds have been shown in mice to drastically enhance the pickup for cesium and rubidium ions.

The toxic dose for CsCl is 135 g. The administration of 6 g per day therefore has no toxic effects. It is sufficient however to give rise to the pH in the cancer cells, bringing them up in a few days to the 8 or above where the life of the cell is short. In addition, the presence of Cs and Rb salts in the body fluids neutralizes the acid toxins leaking out of the tumor mass and renders them nontoxic.

5. TESTS OF THE HIGH pH THERAPY ON MICE AND HUMANS

The therapy has been tested and the results will be discussed briefly below.

5.1. Tests on Mice

The High pH therapy was first tested at American University in Washington, DC using mice. In these tests, 2 mm cubes of mammary tumors were implanted in the abdomens of mice and allowed to grow for 8 days. The mice were then

divided into two groups. Both groups were continued on mouse chow, but the test group was given 1.11 g of rubidium carbonate by mouth per day in aqueous solution. After 13 more days the controls were starting to die so all mice were sacrificed and the tumors removed and weighed. The tumors in the test animals weighed only one eleventh of those in the controls. In addition, the test animals were showing none of the adverse effects of having cancer [3].

Results similar to those mentioned above were obtained at Platteville, WI using CsCl. More recently, Platteville has studied intraperitoneal injection of cesium carbonate for mice with abdominal tumor implants with 97% curative effect.

Tests using intraperitoneal injections of CsCl were carried out by Messiha *et al*. [21]. The results were most successful and showed a drastic shrinkage in the tumor masses.

5.2. Tests on Man

Many tests on humans have been carried out by H. Nieper in Hannover, Germany and by H. Sartori in Washington, DC as well as by a number of other physicians. On the whole, the results have been very satisfactory. It has been observed that all pains associated with cancer disappear within 12 to 24 hr, except in a very few cases where there was a morphine withdrawal problem that required a few more hours. In these tests 2 g doses of CsCl were administered three times per day after eating. In most cases 5 to 10 g of Vitamin C and 100,000 units of Vitamin A, along with 50 to 100 mg of zinc, were also administered. Both Nieper and Sartori were also administering nitrilosides in the form of laetrile. There

are good reasons to believe that the laetrile may be more effective than the vitamins in enhancing the pickup of cesium by the cells.

In addition to the loss of pains, the physical results are a rapid shrinkage of the tumor masses. The material comprising the tumors is secreted as uric acid in the urine; the uric acid content of the urine increases many fold. About 50% of the patients were pronounced terminal, and were not able to work. Of these, a majority have gone back to work.

Two side effects have been observed in some of the patients. These are first nausea, and the second diarrhea. Both depend upon the general condition of the digestive tract. Nieper feels that nausea can be prevented by administering the cesium in a solution of sorbitol. The diarrhea may, to some extent, be affected by the Vitamin C.

Only one case history will be presented here. A woman with 2 hard tumor masses 8 to 10 cm in diameter, one on her thyroid and one on her chest, was given 3 to 6 months to live. She had been subjected to chemotherapy, but was discontinued because it weakened her. She was taking laetrile on her own. She was given a 50 g bottle of CsCl and was told to take 4 g per day. She reported her case a year later. Being very frightened she took the entire 50 g in one week. At the end of that time the tumor masses were very soft, so she obtained another 50 g of CsCl and took it in another week. By the end of that time she could not find the tumors, and two years later there was no sign of their return.

6. LOW INCIDENCE CANCER AREAS

There are a number of areas where the incidences of cancer are very low. Unfortunately, the food composition in these areas has never been analyzed. At the 1978 Stockholm Conference on Food and Cancer it was concluded that there is definitely a connection between the two, but since the relationship was not understood, no conclusions could be drawn [22]. The food intake has been studied by the author as far as possible from the high pH point of view. The results found will be discussed for a number of low incidence areas.

6.1. The Hopi Indians of Arizona

The incidence of cancer among the Hopi Indians is 1 in 1000 as compared to 1 in 4 for the USA as a whole. Fortunately their food has been analyzed from the standpoint of nutritional values [17]. In this study it was shown that the Hopi food runs higher in all the essential minerals than conventional foods. It is very high in potassium and exceptionally high in rubidium. Since the soil is volcanic it must also be very rich in cesium. These Indians live primarily on desert grown calico corn products. Instead of using baking soda they use the ash of chamisa leaves, a desert grown plant. The analyses of this ash showed it to be very rich in rubidium. The Indians also eat many fruits, especially apricots, per day. They always eat the kernels. The results indicate clearly that the Hopi food meets the requirements for the High pH therapy.

6.2. The Pueblo Indians of Arizona

Some 20 years ago the incidence of cancer among the Pueblo Indians was the same as that for the Hopi Indians, since their food was essentially the same. But unlike the Hopi, these Indians have accrued certain items from outside their environment, hence supermarkets were installed in the area. Today the

incidence of cancer among the Pueblos is 1 in 4, the same as the U.S. It is reported that there is a regular epidemic of cancer among them. It must be emphasized here that the high incidence of cancer is not due to what is in the supermarket foods, hut rather to what is not in it. It is essentially lacking rubidium and cesium and low in potassium.

6.3. The Hunza of North Pakistan

Cancer is essentially unknown among the Hunza, but unfortunately their food has never been analyzed. Talks with Hunza themselves and with Hindu professors who have spent some time in the area, have thrown sufficient light upon the food intake to show that it meets the requirements of the High pH therapy. They are essentially vegetarians, and are great fruit eaters, eating ordinarily 40 apricots per day; they always eat the kernels, either directly or as a meal. They drink at least 4 liters of mineral spring waters which abound in the area. Fortunately this water has been analyzed and found to be very rich in cesium. Since the soil is volcanic in nature, it must be concluded that it will be rich in Cs and Rb, as well as K.

6.4. Central and South America

The Indians who live in Central America and on the highland of Peru and Equador have very low incidences of cancer. The soil in these areas is volcanic. Fruit from the areas has been obtained and analyzed for rubidium and cesium and found to run very high in both elements. Cases have been reliably reported where people with advance inoperable cancer have gone to live with these Indians, and found that all tumor masses disappear within a very few months. Clearly the food there meets the high pH requirements.

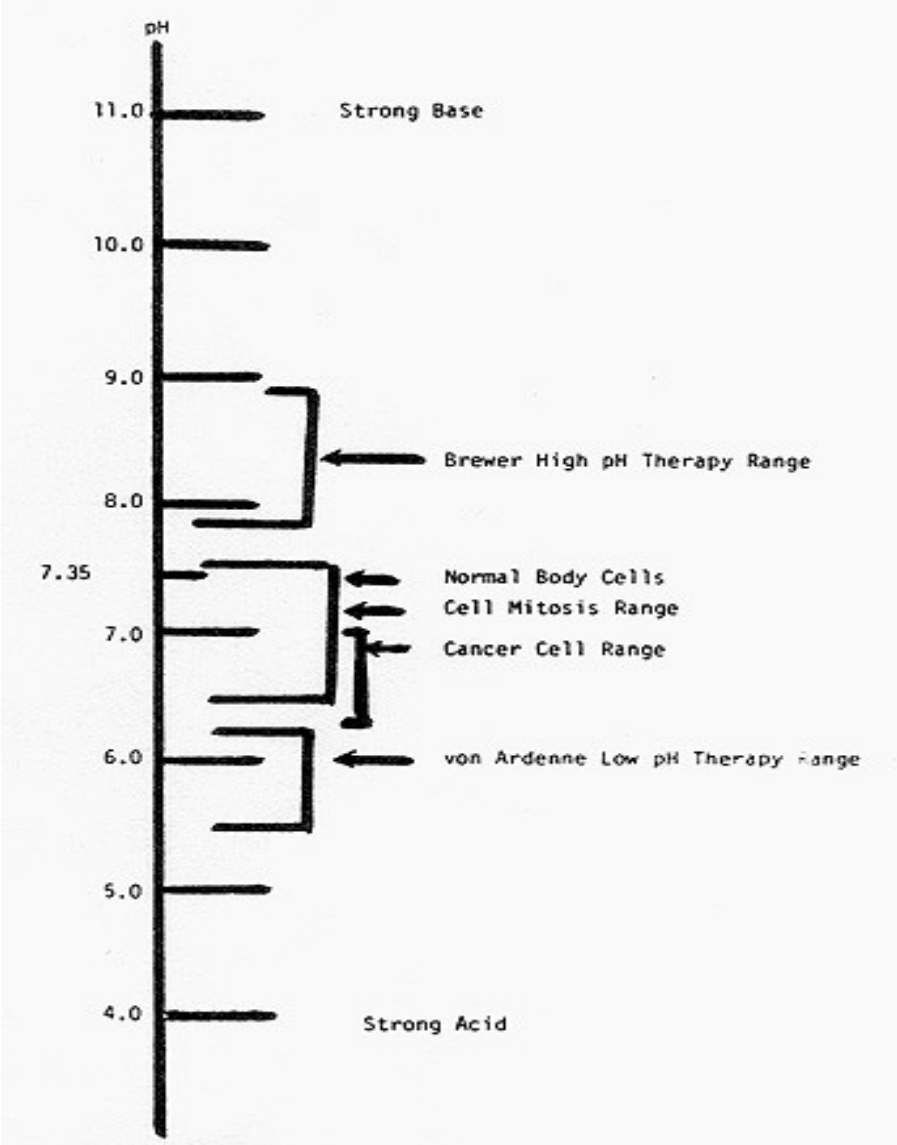

FIG.1. The relationship between pH of cancer cells and cancer progression: the high and low pH therapies.

In conclusion, the High pH therapy, as has been pointed out, was arrived at from physical experiments carried out on cancer and normal cells. It has been tested and found effective on cancers in both mice and humans. There can be no question that Cs and Rb salts, when present in the adjacent fluids, the pH of cancer cells will rise to the point where the life of the cell is short, and that they will also neutralize the acid toxins formed in the tumor mass and render them nontoxic.

7. CESIUM DOSAGE AND SIDE EFFECTS

Several problems have arisen in the therapy which require further study. One of these is to determine the minimal dosage of CsCl that will kill cancer cells. Would cesium carbonate be better? Related to this are the effectiveness of intravenous injections, and, in certain cases, intraperitoneal injections. Both have been found to be effective in mice, but they have not yet been tested on humans.

The minimal dosage for curative action has not been determined. It has been observed by several physicians that the administration of 0.5 g per day of CsCl will actually enhance the rate of tumor growth. This is to be expected, since this low amount is sufficient only to raise the cell pH into the high mitosis range (see Fig 1). The data so far reveal that any quantity of 3.0 g or above will be effective.

A side effect which occurs in some cases, especially those who have had stomach ulcers, is nausea. This is far smaller for 3.0 g per day than for 6 to 10 g. The nausea can be minimized by administering cesium salt in a sorbitol solution as mentioned earlier. Further studies are necessary.

A limited number of patients have experienced diarrhea. Since cesium is a nerve stimulant [19], this can be expected. The effect is enhanced by taking large doses of Vitamin C, but it apparently is lowered by laetrile.

A further study is being made to determine the amount of cesium, rubidium or possible potassium in the diet that is sufficient to prevent cancer. Some data is available on the food composition in areas of the world where cancer is very low, but it is difficult to quantify, since the amount eaten varies greatly between individuals.

The effectiveness of potassium salts is yet to be determined. Tests to date have not been made on leukemia patients.

8. CESIUM BIOLOGICAL USES

In addition to the cancer therapy outlined in this paper, a [19] U.S. Patent has been issued on the use of cesium chloride as a nerve stimulant. Cesium salts are very effective in regulating heart arrhythmia. In areas of the world where cesium in the food intake is high, it has been noted that longevity of well over 100 years is not at all uncommon. Based on experimental data available [21] Cs salts may be useful in the treatment of manic-depressives.

9. ADDENDA

In later writing, Dr. Brewer wrote: "The goal of the high pH therapy is the transport of large quantities

of Cs^+ Rb^+ and glucose-free K^+ across the membranes of cancer cells. During high pH therapy, Dr. H. Nieper, M.D., observed a loss of potassium which should be replaced." Two booklets discussing Dr. Brewer's final theories about cesium are available from the Brewer Science Library: "High pH Cancer Therapy with Cesium," and "Cancer Its Nature and a Proposed Treatment," both by A. Keith Brewer, Ph.D. See http://www.mwt.net/~drbrewer/brew_art.htm#high

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Aubrey Keith Brewer, Ph.D., (1893-1986) the founder of the Brewer International Science Library, had a lifelong desire to understand the processes going on in the living cell. He was convinced that the tools and methods he used in the laboratory as a physicist could be applied to such phenomena as cancer, the aging process and mutations. The development of his theory of the High pH Cancer Therapy with Cesium grew out of his understanding of the physics of the cell membrane. The articles contained in these booklets are representative of the many articles he has written about the development and utilization of this theory. Dr. Brewer funded animal research studies undertaken by Dr. Marilyn Tufte of the Department of Biology at the University of Wisconsin at Platteville, which demonstrated confirmation of his theory on the uptake of cesium by cancer cells.

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A. Keith Brewer. Ph.D. available at: http://www.mwt.net/~drbrewer/intro.htm

My interest in cancer began in the early 1930s. In my mass spectrographic research on the abundance of the isotopes of potassium in nature I found that the $^{39}K/^{41}K$ ratio in ocean water was constant to at least 6 significant figures. In contrast living plant and animal tissues had a slightly higher ratio, the deviation being an inverse function of the amount of calcium in the tissue. A marked exception to the above was found in embryonic and rapidly growing tissues. Here the abundance ratio was close to 14.35 as compared to 14.2000 for ocean water, and 14.20 to 14.25 for normal tissues. Dead tissues in

contrast gave a higher ratio very close to 13.80.

I tried several places to get cancer tissue to test, but at the time was unable to do so, Finally after I had published several papers on potassium isotopes I received a letter from Dr. Arthur Lasnitzki, at Birmingham, stating that he would provide the samples if I would make the tests. This was welcome news. I received a very large number of cancer samples of all kinds, mouse, rat and man, both young and old. All these samples gave the same potassium isotope abundance ratio as embryonic tissues, that is 14.35. There was this difference between the two tissues however; the cancer tissues were essentially free from calcium.

A detailed study was carried out to determine the mechanism involved in the isotope effect in cancer and embryonic tissues, and the opposite effect in dead tissues. It was found that in cancer tissues the ratio of atoms passing through the membrane was a direct function of the ratio in which they struck the bounding medium of the membrane with sufficient force to penetrate the steep potential gradient across the membrane. The lighter isotope struck the membrane surface the more readily. In the case of dead tissues the mechanism was entirely different. Here the attachment was due to selective adsorption; in the case of all atoms the heavier the atom the greater the residual electron acceptor field of the nucleus.

The detailed research I carried out on membrane action showed clearly that the prime contributing factor is to be found in the electrodynamics of the P=O radical which characterizes the cell membrane surfaces. Carcinogens are types of compounds that will form permanent attachments to energized P=O radicals. When such substances combine with the P=O radicals it is then no longer possible to raise the bond into the energized state. In the unenergized state Ca^{++}, Mg^{++}, and Na^{+} cations which transport oxygen into the cell can no longer enter. In contrast potassium which carries glucose into the cell can still enter. In the absence of oxygen the cell loses its pH control and becomes acid, and thus turns into the cancerous state. It is surprising that so few of those working on cancer today have any understanding of the significance of the energized state. I believe that I am one of the few people who has ever studied ion transport across membranes, and also the fluorescence and phosphorescence of membrane surfaces.

The therapy I am proposing is one of changing the pH of the cancer cell from acid to alkaline. This is entirely possible since as already stated, the cancer cells have lost their pH control mechanism. In the alkaline, high pH condition the acid toxins of the cancer cell are neutralized and rendered nontoxic. It is these acid toxins, and not the tumor lump per se, that bring about the death of the host. In the high pH condition the life of the cancer cell is short. The dead cancer cells are readily absorbed by the system and eliminated.

There are areas of the earth where the incidences of cancer are very low. An analysis of the foods in these areas shows them to be very high in cesium and rubidium. It is these elements, which are absent in modern commercial foods, that prevent cancer growth. I am convinced that it is food that causes cancer, but it is the food we don't eat and not the food we do eat. The patent application listed in this book describes a means for introducing the essential elements into the modern diet.

Let us hope for the day when cancer has passed into history.