



william f. koch

Ph. D., M. D.

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THE BASIC CHEMISTRY OF OUR DIET

By Dr. William F. Koch, Ph.D. M.D.

While the purpose of this Treatment is to help the body combat allergies and infections, it has been used from its very inception in the treatment of cancer. ***This is because our working Hypothesis has always based cancer primarily upon infection, and pictures the neoplastic process as an allergy to the toxin of that infection.*** (1) There are two other factors that serve as agents in the carcinogenesis. They are physical and chemical injury to the functional mechanism of the tissue cells that become malignant. Since such injury destroys the ability of the cell to initiate or to conduct oxidation chain reactions to burn sugar in order to produce energy for function, the catalysts necessary to initiate and to carry the oxidation chains are not produced and the oxidation of toxins is necessarily hindered or prevented. The result is that the toxins produced from viruses, germs, or from industrial origin, which act as oxidation inhibitors and possess the specific fluorescence needed to photosynthesize mitosis, are now able to exist unhindered in such injured cells and activate continuous cell division. Cancer like other allergies is thus a deficiency disease. (2) In the class of injured cells, we place the anaplastic embryonic cell nests, which according to the Virchow Theory are the material that becomes malignant. Such cells are without protective functional oxidation mechanisms; also cells that are injured by crushing and tearing may lose their oxidation mechanisms too, and thus be unable to resist the toxins of bacteria and viruses, which exhibit the carcinogenic properties we have announced. The importance of the physical carcinogenic injury is demonstrated from the fact that metastases of cancer cells to various organs do not convert the cells of these tissues to cancer cells. The causative virus is present in the metastasizing cells and this virus has access to the cells of their new host, yet they do not alter the normal behavior of the cells of the organ involved. The time element must, of course, be considered and the injury of instrumentation of injecting a virus is eliminated too. Thus the beginning of the cancer growth need only start in a cell or two that have been chemically or physically injured enough to lose oxidative resistance to the mitogenic factor.

(1) Bulletin, Koch Cancer Foundation, 1926-7, P. Med.-Phys. Bac. 1926-7-8.
(2) Medical Record, Koch. Oct. 20, 1920

THE RECOVERY PROCESS

Before we can consider the diet and environment, we must also have in mind the factors that are at work in the recovery process. **They comprise the restored oxidation mechanisms contributed by the Treatment on the one hand, and on the other, the various influences that hinder the Treatment material from doing its work.** These may be substances that combine and alter the Treatment material or which combine or inactivate the catalysts that carry the oxidation chains we desire to restore. **Since the basis of infection, allergy and cancer is the same in our conception, we eliminate all substances or influences that hinder the oxidation of biological or carcinogenic toxins, or that favor the development of cancer, allergy or infections, so far as we can see. To do this logically, we must consider the chemical structure of carcinogenic toxins of various origins.**

The simplest carcinogens are the metallic elements, principally radium, nickel, chromium, arsenic, and such aliphatic substances as carbon tetrachloride. These substances must have access to the tissues over a prolonged period, five to 30 years for example, and so they do not influence our diet too much. However, as these substances with the exception of arsenic and the chloride compounds, are important oxidation initiators in the high homeopathic dosages, and are oxidation inhibitors in the higher concentrations, they should not be employed in lower potencies or as industrial exposures over long periods. We use them in connection with our Treatment as will soon be seen, but this is for their dynamic effect only. The allopathic physician is not informed on such subjects and while it is not our purpose nor our ability even to teach homeopathy, we must call attention to the biological fact that such low concentration of cobalt, as one part to ten to the thirtieth power of water, is what makes the Saratoga Springs mineral water a useful agent in the treatment of disease, and this same cobalt in the low concentration of one part to ten of the twelfth power of water is needed to make vitamin twelve click. Vitamin twelve, it must be remembered, works best in very high dilutions too, such as one part of the vitamin to a trillion parts or more of water. Thus the cobalt it contains acts in exceedingly high dilutions. It acts as an oxidation chain initiator essential to good health, according to our conception. Cooper is likewise an important agent and so is zinc for pancreatic function and tin for leukocytic activity in our view. All of these metals have their important position in securing electron transfers in the initiation of specific functional oxidations and must be protected against displacement by such elements as aluminum, or must not be inactivated by sulfides in the food, water or in the air we breathe. Sulfides should be prevented from being generated in the intestinal tract also. Besides, a good mucous secretion on the part of the intestinal wall is to be desired in order to hold back the sulfides from passing into the lymph and blood streams of the portal circulation. When efficient mucous is lacking, some non-metallic substitute is required, such as METHYL CELLULOSE, psyllium seed products, the slimy product of the Aloe plant, okra, and others. These materials offer large absorption surfaces that take up toxins and wall off the mucosa surface of the intestine from its toxic contents.

Foods that support sulfide production are principally the proteins of animal origin. Beans have this reputation but it will be found that they offer little or no sulfide production, if the rest of the diet is free from animal proteins. Peas and lentils may be a source of sulfides and they also offer materials that support the tubercle bacillus luxuriantly in artificial culture media. Hence they to are to be eliminated like various flesh products and eggs. When the natural metallic catalysts that must be present in high dilution in the foods are protected by not using meats and aluminum cooking utensils, the advantage is obvious.

TRACE METALS MORE NEEDED IN LYMPHATIC NEOPLASMS

It is my conclusion, that the form of malignancy where the trace metals are more particularly in need of dietary consideration and protection are the neoplasms of lymphatic tissue origin, as Hodgkin's disease and Lymphosarcoma. This is our general experience. The functional efficacy of the white blood cells appears to us to depend upon the electron transfers that the metals are able to accomplish as well as upon good Carbonyl oxidation initiation. We know of no confirmation of this Thesis by others however.

We do not credit hydrogen acceptors such as the Glutathione of Hopkins as being sufficiently high in potency to require time here. Between the years 1912 and 1914 we made some observations on cystine and cysteine as obtainable from human hair in connection with liver and thyroid function. This type of oxidation initiation appears to be more concerned with tissue construction than with the burning of sugar for energy work. The dehydrogenated diamino acid cysteine may serve as an oxidation initiator, useful in correcting the basal cell slow developing cancers of the skin that are so removed with escharotics. Many more cases will have to be treated than those we have observed before a conclusion can be reached on this point. However, oxidation initiators of this type are of no use in our hands in the violent types of cancer we are called upon to treat.

CARBONYL CATALYSTS

This brings us down to the Carbonyl catalysts which we credit with serving the tissue oxidations for work energy production, and which arise in the oxidation of

sugar. The Carbonyl group is always more or less of a hydrogen acceptor, but when it is especially activated as by conjugation with ethylene or acetylene or in series with other Carbonyl groups, it is then that this activity is most pronounced and useful. The most active of such arrangements are, of course, the union of two Carbonyl groups with double bonds. But this is a special subject. The protection of Carbonyl in conjugation with ethylene must again take into consideration the sulfydryl group as present in hydrogen sulfide particularly, and so the use of animal proteins of all types comes up as an offense against good recovery chemistry. A patient may "get by" while eating animal proteins. In fact, the stuffing of patients with animal proteins in hospitals to "give them strength" as they say can be credited with many failures in the ordinary infections like pneumonia and tuberculosis. In cancer it is simply fatal and rapidly so in the whole field of observations that we have made. We have recommended bone broth for its calcium content in the past, and it has been used safely in some patients. But we soon learned that all patients could not take even this, and we saw too many develop indole and skatol in the urine after its use. We therefore discontinued this effort to supply useful food materials in a way that satisfies the cravings for meat of a good part of our patients. Not only are the metallic catalysts endangered by the sulfides, but additions are made to Carbonyl-ethylene conjugates which inactivate them. They also liberate highly active hydrogen that makes additions to free radical oxidation carriers. Of course, when Nature has her most important tools rendered useless in this way, she supplied her second line of agents to do what they can to keep the system going, but this is not what we want. To combat serious disease we must have the best that Nature can offer, and indeed we must add to this even more active oxidation agents than Nature regularly uses, so far as we know. It is to supply such Carbonyl compounds that we have built up our initiators of oxidation chains as we have. But since they are more active than any we know in Nature, they are all the more reactable with the sulfide and amine or the aromatic inhibitors produced by meat putrefaction within the intestinal tract. Thus the pure vegetarian, fruit diet is all the more necessary, while our Treatment is used.

INDIVIDUAL DIGESTIVE CAPACITIES

One must give thought, however, to the digestive capacities of the individual under treatment. It will not alter the rule, but while we have the facts on this subject we may review them. We may use extreme variations as examples, the dog and the cow.

The dog is essentially carnivorous with a protein digestive capacity of high caliber. They may masticate or swallow the meat chunks whole and thrive nutritionally. Yet they often die of cancer. On a pure meat diet, however, they form fewer sulfides than on a mixed diet.

The cow also is subject to cancer, generally located in the face and started by injury to the tissue. Cancer is not frequent, however, and rarely found in any other part of the body. The diet is ideally vegetarian, moreover, and the recovery from cancer on our Treatment is prompt in such cases, as we have seen treated so far. But the dog too may thrive very well indeed on the vegetarian diet, and his response is better on the pure vegetarian diet or on the pure meat diet than on a mixed regime. We can give statistics on this response when both types are diseased by their most frequent type of virus infection. These are Hoof and Mouth disease in the cow and Distemper in the dog. Where complete elimination of interfering factors is attained the recovery percentage on one dose of Carbonyl catalysts is above 95% when all stages of Hoof and Mouth disease are treated in cows and pigs. The same percentage of cure is obtained in dogs with Distemper when they are either on a pure meat diet or on a pure vegetarian diet, but on a mixed diet the recovery percentage dropped and the process took longer. In some cases two doses were needed. We attribute the poorer results on the mixed diet in dogs to the interference with digestion of the meat in the stomach and upper intestine, and its subsequent putrefaction in the large intestine. On the pure vegetable diet the meat putrefaction is largely eliminated. Hence putrefaction amines act as inhibitors also.

WHY ANIMAL PROTEINS SHOULD BE AVOIDED

The inhibiting influence of the highly mobile hydrogen atom of the putrefactive amines on the Remedy itself is well illustrated in an experiment that resulted from

accident. Three syringes well wrapped in sterile cotton but otherwise not protected from substances in the air were kept in a refrigerator in which some meat was stored and became putrid over a period of several days. Although the amines were easily smelled, the syringes were used to give injections to three dogs with Distemper. The dogs died as if not treated. We attribute this failure to the volatile putrefaction amines that diffused into the cavity of the syringes between the barrel and plunger and absorbed into the glass surfaces. This experiment lowered the cure percentage in the first series of one hundred cases fully three percent. In another series, 59 cases, where every precaution was followed there were no failures and only one dog required two doses. In these cases all interference was avoided. Thus it is seen that putrefactive amines inhibit oxidation initiation. The lesson to be taken from these observations is that the digestion of the food in the stomach and upper intestine must be as complete as possible, and that the development of putrefactive amines must, and can be, prevented by the diet. It is best, therefore, not to use any animal proteins at all. In this way, the most obvious inhibitants to the oxidations of function that depend upon Carbonyl activity and the Treatment catalysts can be reduced to a minimum.

TERPENES ALSO INHIBITORS

Another class of inhibitants are substances of terpene structure, or substances that present a hydrogen atom in alpha position to an ethylene linkage or other double bond. Hydrogen atoms in this position are exceptionally active and can reduce the Carbonyl initiators as well as the free radical carriers of the oxidation chains. We, therefore, avoid tomatoes, cocktails, citrus fruit oils, paint polishes, wax solvents, etc., mangoes, and other foods containing substances of this order, as the diet outline shows. * It is of interest to note that the synthetic carcinogens possess several hydrogen atoms of high mobility in alpha position to their respective ethylene linkages. Thus they are able to hinder oxidation chain initiation and conduction that protects the cell. The carcinogens thus have the upper hand once they become established in a cell. Their double bonds exhibit the specific fluorescence required for transferring energy from glycolytic processes into the chemical processes to mitosis. Thus it is easy to understand the persistence of the neoplastic process as we pointed out in our "Chemistry to Natural Immunity" 1936, 1937, and 1939. These very double bonds and the active hydrogen atom alpha thereto offer the means of destruction of the carcinogen by an effective Carbonyl oxidation initiator.
(* Koch Cookbook included on web site.)

OTHER CARCINOGENS

Carcinogens as present in some tar products and lotions used by dermatologists, have, to my knowledge, produced generalized cancer of the skin on the areas where it was applied. Gasoline motor and Diesel exhaust fumes carry good quota of carcinogens in spite of what the gasoline agents say. Much of the cancer of the lung of late is now recognized as due to this factor. The tar road dust is another carrier of carcinogens. Patients under our Treatment for any disease whatsoever should, therefore, avoid the exhaust fumes of internal combustion engines and the dust from tar roads that is if they can. They should at least do their best to avoid them. We have observed the late but persistent effects of the exhaust from farm tractors on a patient who was under treatment for cancer of the stomach. After recovery had gone far enough so the patient could go back to work and run his tractor, the disease recurred more violently than ever, and proved fatal. In such cases the exhaust fumes are poured out right into the workman's face or were brought there by the wind. But the farmer had to do his planting, and no amount of warning was heeded. Carbon monoxide is a deadly oxidation inhibitor like cyanide. Pure air is essential.

While referring to the unsaturated compounds that offer a hazard to health, one should mention the acrolein produced by heating animal fats as in roasting meats or frying potatoes. These acrolein polymers produced by dehydrating the glycerin fraction of the fat give the food a welcome flavor, but they are exceedingly injurious to cancer patients. The poly-acrylic aldehydes are now known to step up the action of the well-known carcinogens a million fold even when used in very minute amounts. Boiling fats in water does not produce this change. Fried foods and roasted meats are, therefore, to be avoided for this additional reason.

As the conveniences of modern civilization pile up, the increase in the incidence of

cancer is also more evident. Fly killing sprays made in a petroleum base, "Canned heat" burners for cooking are among the group which when used by cancer patients make the disease definitely worse. The less civilized people do not and did not show the allergies we do. They were not subjected to the exhaust vapors from automobiles, or cooking gas stoves, and hence their oxidation mechanisms were running on the schedule the Creator had planned, to a better extent than ours. They burned their foods or air contaminates to completion or at least far enough so they could no longer inhibit the normal oxidation process and present an energy shifting fluorescence.

It is evident too that when the natural immunity oxidations are too weak to destroy one allergic agent they will be too weak, very likely, to destroy another as the condition is generally progressive; the trend is toward a broadening of the allergic state. Therefore, when a person is found allergic to one substance, he is likely to be allergic to another substance also. All allergies do not show up as plainly as the running nose of hay fever or the struggles of asthma. The foods that cause them can be easily recognized and eliminated. It is much more difficult to recognize the substances causing the neoplastic response. Here the allergy lies in the mitotic mechanism and the process may go on for quite some time before it is recognized. The patient does not recognize its first cause nor what substances give it impetus. Carcinogens cannot be studied with reference to other allergies than cancer, for obvious reasons. It may be taken as a safe rule then to avoid all foods, perfumes or exposure, which call forth an allergic response of any type. For any of them may aid in the development of the neoplastic state. This is the rule we have long followed. We have for this reason eliminated over heated fats of fried foods or roasted foods. The acrolein formed being a serious offender. It may precipitate an asthmatic attack in some persons, and I have seen it speed up the action of a carcinogen in another.

The value of the lipoids in metabolism is well known now. The natural unsaturated, fatty acids aid in the auto-induced oxidation of toxic materials as the carcinogens. (1) People who use a diet of natural fats have the benefit of the protection they offer. It might be stated that the very first confirmation by scientists outside our group to our Hypothesis that the natural immunity is a matter of auto-induced oxidations, came with a demonstration that the fatty unsaturated acids, such as linoleic acids, when undergoing auto-oxidation could induce the destructive oxidation of carcinogens. We have shown for many years that the unsaturated derivatives of sugar metabolism did this very thing, and that the ordinary fatty acids, by possessing a hydrogen atom of high activity alpha to a Carbonyl group, subjected the carbon chain to de-saturation alpha-beta to this Carbonyl group and hence, the breakdown of fatty acids to a two carbon withdrawal at each step. Thus even the saturated fatty acids became unsaturated in their oxidation and the burning there of for function aided the natural immunity. (2) In this way we pointed out that the unsaturated products of sugar oxidation and the fruit acids of apples aided the oxidations of function and that the colder the winter where the apples grew, the better acceleration was expressed. The citrus fruits, on the other hand, tend to lower the body temperature no matter what the interpretations of citric acid behavior may be. This is largely due to the terpenes they offer. Ascorbic acid present in such fruits tends to oxidize the terpenes, however, and here again Nature presents the first recognized product of sugar oxidation which scientists outside our group have found to undergo auto-oxidation which induces destructive oxidations in carcinogens. (3) The fruits of the North and of the Tropics both serve the oxidation mechanism in a protective way. So, while the Eskimo obtained their protective fat acids from the fish oils, the temperate and tropical zone inhabitants are offered protection in their fruits and vegetables, as well as the fats of animal origin. It is not surprising, therefore, that the members of the family that develop tuberculosis are for the most part those who eat the lean meats only, while those who escape, eat the fats as well. This is an observation we made as early as 1925 and have verified ever since.

- (1) Lipman, Summer, Bergman (1940-1943).
- (2) Natural Immunity, Koch, 1936.
- (3) Warren, 1943.

BEST FATS

The Eskimos rarely develop cancer. The largest part of their diet is fat and this contains full quantity of unsaturated fatty acid. The lesson to be taken from these

facts is that the fats sold for the kitchen and table today, that do not become rancid, are of no help to the health of the body. The preparation of a fat so it will not become rancid is to saturate the unsaturated groups with hydrogen. Generally a nickel catalyst is used. But that makes no difference, perhaps. The destruction of the double bonds in the fatty acid greatly lowers its chance to undergo autoxidation and thus to induce the oxidation of toxins or aid its own oxidation for the production of energy. Everyone should pay particular attention to this, for when the fat is reduced so as to not be able to form peroxides and no longer tastes rancid in consequence, it is difficult to burn in the body and will pile on in undesired places. But worst of all, it is bad for the complexion. Since the auto-oxidations that natural un-saturated fatty acids are intended to produce in germ toxins are no longer possible in Spry and Crisco, so the germs that injure the skin have no such health factor to contend with and can mar the complexion with a much freer hand. Adding oxygen to become the peroxide makes the fat rancid. Therefore, one must buy fats that are not rancid yet, but can come so on exposure to air. It is the process of becoming rancid that is the change that is helpful; not the rancid fat. Thus in the body, the taking up of oxygen to become a peroxide induces other unsaturated atomic groups that are unable to do so themselves to take up oxygen and to become burned also. So it is not only the fat you buy that we are considering, but fats in other foods as well as germ and metabolic toxins that un-saturated fats help to get rid of and convert into energy. But man was originally a fructiverous animal. The primitive mother placed the baby in the grass in the shade of the tree. The ripe fruit fell and rolled by and the baby took after it. The next position of the fruit was at the baby's mouth where it was sucked upon or bit into as its mellowness permitted. Nature went from the breast to tree ripened fruit. The habit of the baby to chase a ball probably is instinctive from such origin. The lesson to be taken from the observations is that, if meat is to be eaten as food, the fat should also be used. However, fruits offer a still better protective mechanism with less chance to block oxidations through the action of the intestinal flora.

USE OF FRUITS

All dicarboxylic fruit acids as malic and succinic, offer a readily dissociated hydrogen atom and can be dehydrogenated to form free neutral radicals and thus aid in the oxidation mechanism. Nature entices us to eat fruits through the fine flavors she offers and she does this so we will obtain from her the protective principles that maintain life. When eating fruits in these days, however, we have to contend with the poisonous effects of bug killers. The arsenical insecticides are the most dangerous of these. Therefore, the fruit must be washed first with soap and water and a good brush until it is clean, and the cavitations where the stem and butt present should be excised as well and discarded. The whole fruit should be eaten; skin and all when dealing with pears and apples or peaches and plums, but the skins of the citrus fruits and the oils they shed should be carefully avoided because of their terpene content. Wild, unripe mangoes are deadly poison because of their terpenes. They protect the fruit from pests, and are a lesson again that the tree ripened fruit is the product Nature wishes us to use. But for cancer patients' mangoes and other terpene fruits must be avoided.

Oxalic acid may be regarded as a near end product of metabolism to be gotten rid of. However, it has certain good effect in high dilution. It helps maintain the coagulability of the blood, for example. But in larger amounts it tends to rob the body of calcium and lower the blood coagulability. Tartaric acid not being readily oxidized in the body likewise tends to carry off valuable salts into the urine. Wines from grapes, and grapes themselves, too often, contain too much tartaric acid for use in large quantities. For our patients it is best to use them sparingly. If further research was done, it may be discovered that in the ripe matured grape, other substances could be present that would aid in the oxidation of tartaric acid. But so far as our observations on wines are concerned, such substances do not appear to exist in detectable amounts. Too much grape juice and too much wine can damage the metabolism without any of the alcohol action. Moderation or the moderate use or avoidance of food materials as common sense dictates, is the lesson to be learned from the grape. You will remember that the Lord Jesus taught moderation or ultra moderation in this matter too. Victims of the total grape diet fads have been found to present serious injuries.

DIET MUST HAVE GOOD NUTRITION

The purpose of diet is not only to escape contrary effects to health and to the action of our Treatment, but also to secure good nutrition. Our desire is to provide all of the building units for tissue reconstruction as well as the dynamic materials needed for activation of the vital processes. These come from the soil and are modified by plants so as to be ready for use in the animal tissues. We include, as part of the characteristics of the soil, the minerals carried in subterranean water. The water should not carry the volcanic or putrefactive sulphides, selenium, or other metals in toxic quantities; yet the trace metals should be present in adequate quantities that are in the homeopathic dosage Nature intended. Cobalt we just spoke of is a fair example. Certain soils are richer in trace amounts than others and many are entirely barren of any such materials. The famous Deaf Smith County Texas has become a popular example of this. However, the newspapers did not get any further than the fluorine content of the soil. It must be emphasized that there are other elements present in healthy amounts in this soil too, and hence, its products and water are good nutrition.

One of the most important precautions in diet is not to stimulate the reproduction of the cancer cells, or of the organisms that force their neoplastic activity, with food materials.

The effects of coffee were reported as carcinogenic by Russo in 1942. The roasting or burning produced the carcinogenic tars, in his opinion. This is, no doubt, true but there is an additional factor. It is the presence of Trigonillic acid and other sulphides, which give it the flavor people like. These in the intestinal tract are converted by the flora into more vicious substances since the flora of different individuals differs, as does the prolonged dangerous effects of coffee on the different individuals. However, the flavor giving sulphides act as oxidation inhibitors and protect the vicious intestinal flora. This in itself is good reason not to use it. Dr. Wm. Hale of the Dow Chemical Co. has contrived a neat way of destroying the injurious sulphides by oxidation with Chlorophyll. This takes the pleasing flavor away and the stimulating effects are felt only. Those who have used his coffee extract reported this to me. The old fashion rye coffee may still present the carcinogenic tars, or may not, experiment only can tell, but it does not carry the injurious sulphides, which may after all be the most important toxin coffee.

It was demonstrated by Gilroy- J. Biol. Chem. 24, p. 1384, 1695, (1930), and the Japanese Suzuki and Eiyas in 1933, that arginine (alpha-amino-delta-guanidine-valeric acid) simulated the growth of malignant tumors in experimental animals. It is known also that the animal body does not synthesize this amino acid rapidly but must depend upon the food for a sufficient supply to support rapid cell reproduction. It is an essential constituent of all proteins and its concentration varies in the different proteins, being most abundant in sperm protamine (87%) and in fish, and almonds and vegetables. It is also twice as abundant in tumor cells than in normal cells. (2) Irons, March 1950, repeated and extended the experiments of Gilroy and Suzuki and found that the growth rate of tissues in situ in culture, or in the body generally and in tumors transplanted into the body or in culture media, was very much greater than the normal rate when Arginine was fed to them or injected. He performed the corollary to this experiment by the injection of Arginase into the tumor bearing animals and into the tumors themselves as well as into normal animals. The reverse effect was definitely observed. Normal tissue underwent necrosis, and malignant tumors were made to undergo the changes we described in the New York Medical Record of October 30th 1920 which are calcification, liquifaction, absorption, invasion with angioblastic tissue, fibroblastic tissue and capillary loops which removed the digested tissue replacing it with fibrosis. The microphotographs we reported in this Journal illustrate the process. In our observations on humans, the absorption of the neoplasms followed to completion on just one dose of the Carbonyl compounds that we isolated from the beef heart, liver, brain and spleen. It appears that all tissues contain the same antagonists to neoplastic growth, but that the heart offers the best source. Iron does not report complete absorption of the neoplasms, but about 30% absorption with change of the rest to the benign state. These also were not followed through, however, to see if further progress would be noted after the tenth day or if the original malignant state would return. There is no identity between Arginase and the Carbonyl compounds that we worked with, as our substances were used in exceedingly high dilution and generally with only one dose while the Arginase must be used in large dosages near the tolerance point of the animal to secure the

changes noted.

(1) Karrar. Org. Chem. p., 299, (1947)

(2) B. A. Kocher. J. Biol. Chem. 22, p.285, (1916)

However, it is demonstrated by the fine observations of Irons that Arginine, as such, is essential to neoplastic growth and can force the rate of growth when the supply is increased. He shows too, that Arginase reverses the process. We may thus conclude, that the guanidine part of the Arginine molecule is essential to the reproduction process and development of cancer cells. This was also an early feature of our Hypothesis for nucleic acid production. Whether or not the carboxyl group at the other end of the carbon chain plays a part, is not known. We mention this possibility because of decarboxylase in the tissues and since decarboxylation changes the physiological effects of the molecule greatly. We isolated this decarboxylated substance from the urines of parathyroidectomized dogs nearly forty years ago (Jour. Biol. Chem. 15, p. 43, (1913). It is a highly toxic guanido-valerio amine. Together with it we isolated methyl guanidine, guanidine, and histamine in toxic amounts.

SPECIAL DIET NOTES FOR CANCER CASES

Whether the virus of cancer or the cancer cells require all of the Arginine, as such, to incorporate into their structure as essential amino acid units, or whether they decarboxylate the Arginine, in part, and thus produce an oxidation inhibitor which destroys the protective powers of the host, has not been studied as yet. This is very probable, however, as an energy source for the virus. The lesson to be taken is that peas, lentils, fish, meat, eggs, almonds, nuts and any other source of excessive amounts of Arginine should be eliminated from the diet, as we have been doing for the past third of a century. It is reassuring indeed that our chemical study of the diet, as supported by the clinical observations covering a long period of years, is now being confirmed by the most recent scientific studies. The rule in this type of therapy should be to follow the diet as we have developed it and forget the hash and ham and eggs.

The position of calcium as an essential in the consideration of the diet in every disease, and especially in cancer, cannot be doubted. The cell bodies of cancer cells do not stain well in hemotoxylin, and other specific stains for calcium show that the protoplasm is very poor in calcium.

It is practically absent in fact. This should be true since the action of the synthetic carcinogenic agents is first of all marked by a loss of 50% of the calcium and iron content in the cells acted upon even before they have become fully malignant. When they have become malignant, the rest of the calcium, iron and lipid are lost. Calcium is certainly necessary to cellular oxidation, and cancer cells have lost their functional oxidation mechanism together with the calcium, in becoming anaplastic. One can see that the two factors work together. But calcium is necessary in another sense, just as it is needed for the coagulation of blood or the digestive clotting of milk, where it forms respectively fibrin and calcium caseinate. This, however, is a passive use of calcium and is due to the acids formed in the digestive process which combine the calcium as to form complex salts. In our October 30, 1920 article in the New York Medical Record, we demonstrated this use of calcium as essential to the process of removing effect material as dead cancer cells or coagulated blood, which of course must be digested and absorbed by organization. This is seen as the in-growth of fine capillaries in the microphotographs. The fact that Arginase will bring about similar calcification changes as reported by Irons, shows that the cancer cells are undergoing a physiological absorption and thus that so far as the process had progressed, a physiological involution was induced. Loss of an essential amino acid, in this way, could certainly be lethal. These observations again emphasize the essential role of calcium in the oxidation mechanism.

CALCIUM IMPORTANT

The cleavage of Arginine to guanidine and ornithin by Arginase brings up the action of the guanidin that is liberated within the cells themselves. We reported in the same paper that the blood underwent anti-mortem coagulation when guanidin was present in toxic quantities. Thus the coagulation of the cancer cells could be a lethal result of guanidine activity. The liver extract carrying the Arginase also contains the "Tissue Thrombin" we have reported as an impurity. The calcium

deposition would again be the very necessary part of the first phase of digestion of the effected tissue; therefore, in any event, the place of calcium in the diet is therefore demonstrated here again. However, the action of any ferment introduced into the system or into a tissue in more than normal amounts, calls for the production of an anti-ferment. So as a treatment proposition, the end results of Arginase would be worse than if it had never been used.

This is especially true since the recovery process only removes a minor part of the tumor cells; the others having a chance to develop antiarginase soon prevent any action of the ferment. The many experimental means of destroying cancer in mice or rats have never proved valuable clinically for this reason. It must be concluded; therefore, that the calcium is needed to keep the tissues from going malignant and to eliminate cancer cells as fast as they die. When it is not supplied, the autolytic process is held up and over growths of angioblastic tissue for the purpose of removing the dead cancer cells will continue being formed, producing tumors as large as, or maybe larger than the original growth but all in vain. The production of such vascular tumors is very depleting to nutrient material. The patient shows loss of strength and weight, together with the increase in the size of the tumor, and an interference to function may be serious through pressure. This gives the picture of progress of the disease when the real situation is basically a deficiency in calcium, while the disease cause has actually been removed, and if calcium were supplied properly, all would go well.

CALCIUM PROTECTS AGAINST ACTION OF TOXINS

There is another function of calcium besides playing a part in the oxidation mechanism of function and in the digestion of dead tissue material for its elimination. This other function is the protection against the action of the toxins. It is of two types. In the first place, the calcium tends to preserve a state of dispersion of water in the lipid phase within the cell protoplasm. Water-soluble substances of toxic nature do not readily enter through the lipid membrane that has formed by diffusion of fat to the surface of the cell. The lipoids form a wall of protection. Through the action of carcinogens, the tissue cells while becoming cancer cells, demonstrate a lipid in water phase and lose their lipid content and hence, whatever lipid traces may remain are also found in a water phase. Thus water-soluble substances, be they food or toxins, find easy entrance and the cell is readily stimulated or further poisoned. For this reason, cancer cells are more readily killed than normal cells, and likewise, they multiply more rapidly and are more dangerous to the rest of the body. The supply of calcium in good quantity offers them something they cannot use, but may help them anchor lipid material and reverse their dispersion to a water in lipid phase. The monovalent cations of sodium antagonize this protective action of calcium. Hence, the diet should take this fact into consideration by feeding less sodium while giving more calcium. Hydrochloric acid is needed to fix the calcium and should be prescribed regularly in the usual way.

IMPORTANCE OF SILICON

In connection with the utilization of calcium, silicon is important. It is my duty to emphasize the value of whole grain cereals, and especially whole rye, for this reason. Rye is generally grown in a soft sandy soil that does not support much else. This was easily tilled with the crude farming implements of the ancients. It naturally became the principle grain until the large plows or tractors could be put to work on the heavy clay soils. Then wheat became the grain of predominance. Commercial rather than nutritional considerations brought on this change. However, there are still some localities where rye is the principle product and food. Russia and the Balkans, in general, grow and eat much rye. Compare their health with that of the rest of the world. In the small country Belgium, I had the opportunity to look into this matter. The peasants ate rye bread. It was the whole grain well ground. The bread tasted delicious and one could eat and eat this black bread and butter to one's fill without wanting anything also on the menu. The peasants were a hardy example of physical health. Cancer and tuberculosis were rare among them. In the same country are the middle class of commercial and professional society and the upper social classes who ate white bread, wheat of course. They were the most unhealthy cancer laden people I have ever seen. The great variable between the peasant and the rest of the populace was the diet and chief of this was the rye bread. The long life of the ancients and of the Balkan races today is attributable, in my opinion, to the whole rye rather than the sour

milk and garlic they are supposed to eat.

The factor in rye, one at least, which is of utmost importance in my mind is the fact that the roots take up pure silicon compounds from the soil, which are brought to the surface of the grain where the sun does its miracle and produces oxysilicon catalysts which are comparable to our carbonyl compounds and serve as oxidation chain initiators. You will recall from your chemistry, that carbon and silicon belong to the same group of elements in the Periodic System, and in some respects can be interchanged.

The hydrosilicons are well known as comparable to the hydrocarbons as lubricating oils. In the crude way then there is interchangeability. But in the more refined sense also we have the siloxin compounds, which are used to sensitize photographic plates to the red and longer rays of light. The carbon compound photosensitizers have competition here. In nutrition, however, carbon is far superior in so many ways as a builder of living objects that there can be no displacement except in certain particulars and the one outstanding case is that of the silicon compounds in the surface of the rye, altered by the sun's rays to serve in oxidation catalysis. It is my opinion, that the locality for their service is within the intestinal tract in an important way for they may not be too well absorbed from the intestine, and here they can aid the oxidations in germs to keep them from being toxic and correct the pathogenic trend in viruses. However, silicon is essential to the tissues. Oxidation catalysts of this order should hold specific positions in the tissues too. At any rate the grand total of observations points to their importance in the body as a whole. In the face of the importance of whole rye products the struggle to obtain them is increasing with each year. Deceptive advertisements for denuded white flour does a large part in keeping people from healthful diet and their added vitamins is worse than a joke. When we wish to lower the resistance of rats to make infecting them easy, we just feed them white bread for a short time. The millers know that placing some whole wheat or rye about their factory will keep the rats from eating into the white flour sacks looking for food.

NEED OF FURTHER STUDY

There are many factors in diet that have not been explored. The antibiotic power of honey, of dandelion and of many homeopathic remedies should be further studied. The active agents that we ourselves have identified are the Quinonoid structures that serve as oxidation initiators. I have observed some very interesting plants in the tropics, which prove, out our whole Thesis. They must be studied further. The need for such a study, especially in a team-organized form, has appealed to some of the men of our group and they are asking for an organized study of the basic chemistry of our Theory, as it gleams forth from the research done by this clinic.

A society could function as a study club of Pan-American proportions for here we have much to contribute. It is here that viruses play a prominent place in disease production in man and animals. The virulence of their toxicity is definitely associated with the nutritional value of the soil. The sum total of defective nutrition as we see it here is expressed in a weakness of the tissue oxidation mechanism. The material needed to build oxidation machinery is simply lacking. It is easy to bruise fruit so it will be attacked by parasites and show decay. Even plants illustrate the incapacitation of the oxidation mechanisms produced by mechanical injury to the cell structure. This in animal cells is also evident in the production of cancer. The physical injury blots out the oxidation mechanism that should destroy the carcinogenic toxin. Poor nutrition lowers the tissue resistance so that lesser injury is able to bring forth disease in this way. These forces must be studied quantitatively and any group that assembles for the study of the natural immunity of animals, plants and humans will give great aid to the work we are doing.

At present, I am engaged in the study of serious virus diseases in animals and man. The animals are for the most part quite costly. Crude experimentation is not possible for this reason but close study such as is possible in humans is followed. Each animal is treated as a costly individual. Large numbers of animals in different sections of the country are available for study and treatment, and the statements here are emphatically supported. Where the nutrition is good as in the South of Brazil and Argentina, Hoof and Mouth disease is mild and rarely kills in the acute

attack, but it soon runs a chronic course that is fatal in three or four years by way of myocarditis and malnutrition through which infections take hold and prove fatal. The virus is a great oxidation inhibitor. It itself appears to be suffering for correction of this defect, so it multiplies for survival at top speed, grabbing off every oxidation agent it can take from the tissue cells it invades. We are good to it and supply it with its heart's desire. A good carbonyl oxidation catalyst is introduced and its metabolism corrects and mutates back to a harmless part of creation doing the work the Creator intended it should do. Where the soil is poor, virus infections are most deadly. In many instances, the Hoof and Mouth disease virus multiples so rapidly in the blood stream that its toxin proves fatal even before lesions can be produced in the hoof or mouth.

I have seen these animals drop dead, dropping dead, and getting ready to drop dead. We have had the opportunity to give one injection to such animals that were unable to keep on their feet or even as they lay on the ground, unable to raise their heads or feet. Following the one injection in many instances the animals made prompt recoveries. In some large herds the recoveries ran well over 90% in cows and in pigs. This is interesting since in pigs the disease once showing up in a herd, goes right through the herd killing all. In such herds that were heavily affected and the fazendeiro fully expected to lose the whole herd, we have been able to see 94% of the sick animals cured and the rest prevented from developing the disease. Thus the oxidation mechanism in viruses that are pathogenic is what needs to be healed and the same holds for the host. Although we generally think of these things turned about.

In animals, the meat eating and the vegetarian suffer about the same as the defect is ultimately traceable to the soil. And the virulence of Cinemosa in dogs bares a relation to the nutritional geography, but this is not so evident as in cows with Aftosa. This disease, Distemper, is 100% fatal, taking longer to prove so where the nutrition is best. After our Treatment the recoveries that follow run about the same percentage. That is over 90% where interfering factors are eliminated. Thus it is evident that our knowledge of the therapeutic chemistry of virus diseases is fairly complete. This applies also to cancer.

Before the electronic microscope was invented no one could say for sure that a virus caused cancer. That it was caused by the toxin of infection we always held, and we described this infection as ultramicroscopic and anaerobic in nature, much like the toxic factor of Syphilis. The Bulletins of the Koch Cancer Foundation (1925-27) stated in each issue on the back of the cover page a group of fundamental principles of this Therapy. This description included the statement on the infectious nature of the cause. Now that the virus can be seen in cancer cells of all kinds, even undergoing cell division, there is no doubt as to the fact. We had no electronic microscope with which to detect the virus, but we studied its toxin and from its chemistry we worked out the manner of its action and the means of destroying it or rather changing it from a vicious agent to a harmless form of life. The nutrition problem carries as much importance in cancer as in the animal diseases.

Here the importance of special foods and their chemistry will command interest, and demand further investigation. The hindering action of the terpene like substances in citrus fruit, mangoes, and the like, the effects of arsenic insecticides, artificial soil fertilization, deficiency in trace elements, must be investigated with many other features of our modern civilization. Smoked foods, industrial hazards, automobile exhaust fumes could be added to the list. Much has been written accurately on these subjects, and needs only to be abstracted and assembled for our general use. But most of all we must gather data from our case histories and discuss this data without reserve. If we do this frankly as we must, we will learn much as a group that many of us know only personally. We must pool our knowledge!

W. F. Koch, Ph.D. M.D.
Rio de Janeiro, Brazil, September 1950.

GLOSSARY

Anaplastic, adjective of noun anaplasty which refers to a reversion of cells to a

more primitive and undifferentiated form; a change in a cell by which it becomes incapable of attaining perfect structure and function.

Autoxidation, self-oxidation from within so that no outside oxidation factor is necessary. See oxidation.

Carcinogen, an agent which brings about or helps bring about a malignancy, a cancer.

Carcinogenesis, refers to the beginning stages of the malignancy or cancer.

Catalyst, a stepping-up agent, something which causes or speeds up a chemical action.

Lipoid, resembling fat.

Metastasize, to spread, as when cancer spreads from one part of the body to another.

Mitosis, the division of cells in the body, thus multiplying many times their original number.

Neoplasm, an abnormal new growth of tissue, a tumor.

Oxidation, the operation of converting into an oxide, referred to in here as the burning off or elimination of poisonous material in the system.

Oxidation Inhibitor, any agent which cuts down or prevents the oxidation system from functioning normally.

Oxidation Initiator, any agent which helps to bring about the natural oxidation or burning off of the poisonous material in the body.

Toxin, a poison.