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Title	From Radiation Therapy to Immunity Therapy in Treating Cancer : How are cancer cells destroyed?
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Citation	日本医学放射線学会雑誌. 1966, 26(1), p. 1-10
Version Type	VoR
URL	https://hdl.handle.net/11094/14899
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特別掲載

From Radiation Therapy to Immunity Therapy in Treating Cancer (How are cancer cells destroyed?)

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癌の治療法は放射線療法から免疫療法へ

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（昭和41年2月16日受付）

放射線照射の生物学的作用機構も未だ充分明かにされていないのに，又癌を擁する担癌個体については生物学的に未だ充分に究められていないのに，放射線発生装置ばかりは超高圧高エネルギー大線量装置に向つて発展し，且つ之によつて集中照射して病巣線量の増大を計る事を以て今日癌照射治療の世界の趨勢とされているのは全く「不合理」であると申さねばならぬ．もし，世界を風靡しているこの照射法が合理的であつたならば現段階に於ては癌は放射線照射で治らねばならぬ筈であると思う．併し事実は寧ろ逆の結果であるが之は如何？．他面，過去の放射線治療を回顧してみると，今日の$^{1}/_{10}$～$^{1}/_{20}$の低圧で不充分な病巣線量の時代であつたが，今日に優るとも劣らぬ治療成績を挙げた症例は洋の東西を問わず常に経験して来たのである．

然らば之は「一体何が狂つているのであろうか」？．この疑問を解明することこそ癌の治療成績を向上させる上に最も重大な事であり，之を検討することこそ医学放射線学を専攻するものの義務と責任ではあるまいか？と私は考えざるを得ない．

私はこの問題と取組み，先づ放射線照射の生物学的作用機構を解明せんと企て，次ぎに担癌個体が正常個体と如何に異るかを生物学的に追及せんと企て，実験的並に臨床的研究を行い次の如き結論を得たのである．

先づ放射線照射の生物学的作用機構については，放射線照射を受けた癌細胞はその一次的作用によつて物理学的に直接破壊される．而してこの変性死滅した癌細胞の分解産物はその担癌個体に対して自家抗原として働らき，之に対して自家抗体が産生されて放射線照射の效果は純二次的生物学的に（免疫的に）増巾される．と，

放射線照射による癌細胞の崩壊度は一次的作用に於ては勿論病巣線量に比例するが，純二次的生物学的作用は全身的な要素即ち，自己防衛能（例えば免疫，物質並にエネルギー代謝等，全身的な抗癌因子）に関連して左右される事を発見し，玆に当然各個体に対して適度な照射量（病巣線量）がなければならないと云う限界の存在を確認したのである．従つてこの防衛能力の如何によつて癌細胞の崩壊度が左右される事を識つた．以上の生

物学的作用機構の基礎機転を私は「自家抗体説」と名命した．

他面，私は照射を受ける側，即ち担癌個体の生物学的研究に於ては，癌の発生発育による個体の変調を確認し，この変調は放射線照射によつて矯められる事を明かにし，純二次的生物学的作用の強大な力を実証したのであるが，この変調がその個体に於て限界を越えれば叙上の自己防衛能は低下或いは消失し如何とも致し難い事態に至る事を発見したのである．斯くの如く放射線照射の生物学的作用機構を通じて私共は色々新知見を学んだが，之を纏めて見ると，即ち放射線療法の目的は全癌細胞を直接一次的作用によつて崩壊させるのが目的ではなくて，適度に癌細胞を破壊する事によつてその分解産物に対する抗体が担癌個体の中に出来，之が癌の発育によつて醸成されたその個体の変調を矯正し，茲に個体全体の自己防衛能を昂めて治癒にみちびく事を確認したのである．

従つて個体に於て適度に癌細胞を崩壊させる方法が他にあるならば，その效果は放射線照射療法と何等変りなく有效であるべきであり，私共は自家免疫論に従つてこの事実を実験的に実証して既に報告した通りである．

茲で私はこれ等の事実に基づいて癌の新らしい治療法を考察した．

（1） 術前照射

（2） 摘出癌組織の治療的移植法を正規の癌の治療法と定め，日常適用し乍ら以上の理論の正しきか否かを批判して来たのであるが，今日その著效を体験しつつある次第である．以上の実験的並に臨床上の事実から放射線照射療法の中には免疫が重大な役割を演じている事を充分理解する事が出来るが，この事実は今日迄癌免疫の実在についてとかく不明瞭であつた諸点を解明し，最早癌免疫の実在には異論のない事を実証したと云えよう．之は全く予測せざる大収獲と云わねばならぬ．

茲で曩きに懐いた疑問の解明を企てておく必要がある．現在世界を風靡する超高圧高エネルギー大線量集中照射法が，なぜ予期の成果を挙げ得ないかを反省して見よう．

読者の中にはこの大線量照射法で良い成績を挙げていられる方は尠くないと思う．この方々が私のこの論文に対して，この事実を如何に説明するかと反問されるにちがいない．私も亦斯る自家経験例を持つているのである．

併し之は初期癌か，多くは可視領域に存在する限局した癌の場合のことであつて，尠くとも，曩きに述べた自己防衛能が或程度低下した症例に於ては有害でこそあれ有效ではない．然らばこの良好なる症例に於てこの結果を如何に説明するかとお叱りを受ける事であろう．これ等の症例に於ては放射線束の強力な物理学的な破壊力を外科手術に於ける「メス」の代用として使つたと同様なことであつて，何等理論はなく，結果的に運よく良好な成果を挙げ得たに過ぎない．而して決して放射線生物学的作用機構に則つた正規の放射線照射療法とは云えない．勿論叙上の正規の治療法をもつてすればより容易に可能な筈である．

癌の放射線療法に当つてはよく担癌個体の状態を知り，この自己防衛を向上させるべく行わるべきであり，初期か末期かの実態を把握することもなく，只病巣線量のみを考えて病巣に集中照射を行う照射方式では，角を矯めて牛を殺すの類と譏られても止むを得ないであろう．

過大な病巣線量によつて過剰な細胞の崩壊産物が血中に放出されれば，之によつて個体の自己防衛能は障害されるであろう事はカスパリー教授の示唆を俟つまでもなく御体験の通りである．茲で治療の成否の鍵は照射する側より寧ろ照射される側にあると云つても過言ではない．従つて治療の重大な問題点は担癌個体の自己防衛能を如何にして窺知するかと云う事になるのである．之は又放射線照射效果を如何に判定するかと云う事にも通ずる．

この全く不明な担癌個体の自己防衛能は術前照射を行つて見ると，組織所見に俟たずとも，臨床所見が之に対し重大な示唆を与えていることを知つたのである．即ち私は臨床症状の改善度から第Ⅰ型から第Ⅲ型に病態を分類し，この各型の精密検査成績，遠隔成績から凡その病態を推理することが出来る事を確認したのである．例えば第Ⅰ型

は自己防衛能を充分に持ち，放射線照射にも，手術にもよく反応する最良の型であり，第Ⅲ型は末期癌として最早如何ともなし難い症例である如く．この事実は申すまでもなく放射線照射による「細胞の死」から出発する純二次的生物学的作用の顕現であつて，自家免疫に連らなる担癌個体の反応に外ならぬ．之によつて治療效果の判定，今後の治療方針の決定が容易になつた事は本研究の大きな収獲と云えよう．

茲で表題の如く，癌の治療は能動免疫療法の成功から受動免疫療法に発展し，今や癌の治療法は免疫を基盤として放射線照射療法と外科侵襲の共同戦線に俟たねばならぬ時代となつた．

There is a foremost problem that must be resolved in not only the utilization of radiation in therapy but also in the study of late effects of radiation in atomic bomb survivors and of methods of preventing radiation damage. The biological action mechanism of radiation—the changes that develop in an irradiated individual—must be elucidated. Radiation therapy is widely used and various studies on radiation are in progress despite the fact that this basic problem is yet not sufficiently solved. This I consider to be not only illogical but also dangerous.

From 1935 I have been engaged in studies to elucidate this basic mechanism and recently confirmed that radiation therapy of cancer is a kind of active immunity therapy. Cancer therapy that I have conducted according to this new concept has brought about remarkable results and therefore I keenly feel that this would introduce an important turning point in cancer therapy.

First, experiments were conducted to determine the effect of X-ray irradiation on substance metabolism of malignant tumors. In these experiments using transplantable Kato strain rabbit sarcoma, I first directed my attention to changes in inorganic base metabolism and energy metabolism of major organs due to the development and growth of tumors, and then the subsequent changes in these metabolisms as the tumors following X-ray irradiation became smaller in size and disappeared.

Through these experiments it was ascertained that abnormality favorable to tumor growth developed in these metabolisms simultaneous with tumor development and growth, but X-ray irradiation caused the tumors to become smaller in size and disappear, the abnormal metabolisms to normalize, and the life of the tumor-bearing individuals to be remarkably extended.

These experimental findings were also confirmed in my recent clinical experiments. This secondary biological action of radiation exposure was demonstrated experimentally 30 years ago. (1).

It is the current trend in radiation therapy of cancer throughout the world to focus attention on how to increase focus dose. This trend only stresses the primary action effect of radiation exposure and gives little regard to the generalized secondary action effect of radiation.

Further comment on cancer therapy is pertinent. As described earlier, with the development and growth of tumor various changes develop in the tumor bearing individual and such changes vary greatly from the initial to the terminal stage of cancer. In radiation therapy a number of variables are involved, such as radiation ray quality, radiation dose and irradiation procedure. Therefore, the effect of cancer therapy is dependent on the complicated combination of these factors. I am not in accord with cancer therapy of the present day which is conducted without due consideration of these basic conditions. It is evident without further elaboration that the various problems in radiation therapy of cancer cannot be resolved merely by studying the question of focus dose. This is the reason why I completely disagree with "massive doses of supervoltage and high energy radiation" and why I believe that cancer therapy should

at earliest possible date be performed with full recognition of the biological action mechanism of radiation.

There are cancer patients whose general physical condition wouod continue to aggravate by increasing focus dose and who would die earlier than expected, but on the other hand some cancer cases would response most favorably to what could be considered to be an insufficient focus dose. Any clinician engaged in radiation therapy of cancer would encounter such cases in his practice. I am at a loss why it is the current trend throughout the world to continue to direct attention only to focus dose without attempting to learn the reasons for such important and interesting therapeutic results in cancer patients.

From the beginning of this century Professor Caspari has attached much importance to the foregoing generalized secondary action and based on his clinical findings he developed what is called the "necrohormone theory." Being in accord with his theory, I have applied it toward developing my own assumption, but detailed review of his necrohormone theory has revealed that various clinical findings could not always be logically explained. This led me to re-evaluate his necrohormone theory.

Necrohormones defined by Professor Caspari is the name given to the decomposed products of cells physically destroyed by the direct action of radiation exposure. However, no new hormones are produced by radiation. The composition of these necrohormones is extremely complicated, containing all the elements making up the cells, such as proteins, lipids and carbohydrates. For this reason it cannot be considered that these necrohormones are simply disposed, but instead in the process a strong reaction must be brought about. This led me to study how the decomposed products of these cells are disposed within the body in my attempt to elucidate the biologicl action mechanism of radiation. As the decomposed products of these cells were originally a part of the living body, they should have been a completely harmless component of the body, but when cells die, they become so to speak an "alien substance" to the body. Therefore, it is reasonable to assume that the living body would show some response against such products. I have assumed that auto-antibodies are produced in response to the decomposed products of these cells.

According to the auto-immunity theory, in the normal living body antibodies cannot be produced for its cells, but if cells degenerate and die, antibodies for such cells can be produced. It goes without saying that following irradiation degeneration develops in the cells causing their death and the decomposed products of thse cells, being alien substance to the body, serve as auto-antigens and produce auto-antibodies.

Regardless how logical this theory may be, it cannot be accepted unless the production of antibodies can actually be demonstrated. I have therefore conducted the following experiments in order to demonstrate these antibodies.

In 1962 the cancer tissue of a gastric cancer patient who responded favorably to pre-operative irradiation was quick-frozen and antigen-antibody reaction was made between the auto-antigen produced therefrom and the serum of this individual. Both the precipitation reaction and complement fixation test were negative, but by Boyden's tannic acid treated sheep erythrocyte agglutination test auto-antibodies were demonstrated, confirming the production of antibodies (2). No antibody could be discovered in the cancer patient not given pre-operative irradiation nor was there any reaction against the antigen of another individual, but in the patient having large ruptured tumors a minute amount of antibodies could be demonstrated. It is assumed that through the production of auto-antibodies the chantes brought about by the development and growth of cancer were normalized, the size of the tumor was reduced and life was remarkably extended.

This auto-antibody theory was further verified by using rabbit kidneys and the results were reported in Hiroshima Igaku (Journal of the Hiroshima Medical Association) Vol. 16, 11—12, 1963 under the title "Experimental Study on the Radiobiological Mechanism." This I have reported as "Auto-antibody Theory."

Based on the foregoing theory, the biological action mechanism of radiation in cancer therapy can be summarized as follows. The cells exposed to radiation are directly and physically destroyed by the primary action of radiation and then the decomposed products of cells which have degenerated and died act as auto-antigens on the body to produce auto-antibodies. The primary action effect of radiation is thus amplified secondarily and biologically (immunologically) by these auto-antibodies.

To pursue this question further, I have made a comparative review of the primary action and the secondary biological effect of radiation therapy. Our results of treating cancer show that the primary action of radiation persists for only 20 days and from 50 to 100 minutes when 2,000 r is given in divided doses and during this period some of the irradiated cells degenerate and die. Nonetheless, the course of the cancer patients is favorable for 6 months and even 1 year and at times permanent cure is brought about. We have observed through radiation therapy a major change in cancer patients bringing about a complete improvement in their constitution. This cannot be explained merely by the primary action effect of radiation, but is attributable to the aforementioned secondary biological action effect which persists for an extended period after the death of irradiated cells. To this date this phenomenon could not be adequately explained by the necrohormone theory nor by other theories, but it can be readily understood by the auto-antibody theory.

If following pre-operative irradiation cancer tissue is surgically extirpated, would the body no longer have the ability to produce antigens? If so, would antibodies no longer be produced in the body? How can this production of antibodies be made to persist for an extended period? With regard to these pertinent questions, the foregoing theory and results of my experiments pointed out the following important points. The aforementioned secondary biological action effect is not directly dependent on ray quality, radiation dose nor irradiation procedure, but is a purely secondary biological change attributable to "death of cells." Regardless of method in which the cells are destroyed, auto-antibodies are produced so long as cells die. This points out that it is only necessary to kill an adequate amount of cancer cells at the proper time. If this can be done by means not causing any pain, radiation need not be considered. Mechanical procedures, heat and drugs may be employed to accomplish this. If the effect of anti-cancer drugs can be localized to kill tumor cells rather than acting on the entire body, it can be expected to produce the same effect as the purely secondary biological action of radiation.

Next, my interest was directed toward developing a method of utilizing the extirpated cancer tissue toward killing cancer cells. This inquiry necessarily led to the discovery of a completely new therapeutic method—the therapeutic transplantation of the extirpated cancer tissue. The foregoing serves to describe the historical course leading to the need of moving from radiation therapy to immunity therapy in treating cancer.

Based on the foregoing theory and findings, from the latter part of 1960 I have administered on cancer patients pre-operative irradiation followed by therapeutic transplantation of the extirpated cancer tissue. I was invited to read the first report covering the results for the recent four years at the symposium "Biological Foundations of Radiotherapy" of the 11th International Congress of Radiology held in Rome

on Septermber 1965. The response to the report was most favorable (3).

The regular therapeutic procedure we currently employ in treating cancer involves (1) pre-operative irradiagion and (2) therapeutic transplantation of extirpated cancer tissue. (One week after quick-freezing at −25°C, the tissue is subcutaneously transplanted on the thigh.) It is evident from the foregoing description that both of these procedures are active immunity therapy.

In reviewing the literature regarding immunology of cancer, since Ehrlich's report made in 1906 at the International Congress of Cancer held in Frankfurt, Germany describing his successful attempt in experimentally inducing active cancer immunity, this question of cancer immunity has attracted widespread attention. From the beginning of the century 23 workers have reported in literature the results of active immunity therapy using cancer tissue, but nonetheless it appears that neither the theories involved nor the methods employed have been favorably accepted. On the contrary, the results I have obtained during the recent five years have begun to verify that the method of ours is not only very logical but safe.

The foregoing provides clinical evidence that radiation therapy is a type of active immunity therapy, the basis of which is death of cells induced directly by the physical destruction of cells through irradiation. In determining the optimum correlation between the cancer bearing individual, tumor and irradiation, we would face a "barrier." If massive irradiation of the cancer bearing individual does not affect his self-defense ability, it would be proper to irradiate the tumor cells intensively and extensively.

Therefore, it would be pertinent to inquire into the reasons why the currently employed supervoltage and high energy irradiation method does not necessarily bring about favorable results.

First, review should be made to ascertain if the heretofore method of evaluating irradiation effect is proper, illogical or erroneous. In order to determine the proper irradiation condition, the criterion to evaluate radiation effect should be established.

At present the degree in which the cancer cells are destroyed as determined from the histological findings of irradiated cancer tissue is used as criterion. There is no argument against this criterion, but errors are introduced because no consideration is given to the period following irradiation when the cancer tissue is extirpated for histological examination. My studies have shown that the effect of irradiation, that is the direct and primary destruction of cells by radiation, is evident only while the cancer bearing individual is being irradiated and thereafter it is the secondary biological action which causes the cancer cells to be destroyed. An evaluation criterion which ignores this important time factor is of little significance. For example, evaluation of effect based on cancer tissue extirpated 1—2 weeks following irradiation is useless, because if the irradiation dose is small, cell destruction would be negligible, while if the dose is large, there would be considerable cells degeneration at such time. Inasmuch as the current evaluation criterion is based on the destruction induced by primary action of radiation, this criterion cannot be satisfied unless a large dose of supervoltage and high energy radiation is administered. Therefore, it is the current practice to give dose large enough to satisfy this criterion, but results contrary to what is expected are brought about. Why have workers in the past not reconsidered and reviewed the reason why favorable results are not introduced by such therapy?

As deseribed earlier, the secondary biological action which displays a tremendous effect is based upon the death of cells. There must therefore exist a close correlation between the degree of "cell death." that is focus dose, the amount of resultant decomposed product, and biological action effect. With regard

to this point, from the early part of the century Professor Caspari has pointed out that the decomposed products (necrohormones) of cells follow the Arndt-Schultz's law like a kind of drug in demonstrating its biological action. If cancer cells are adequately destroyed by the primary action, auto-antibodies are produced in the entire body as the tumor becomes smaller in size and with the lapse of time cancer cells are further destroyed, bringing about a favorable course. If, however, the cancer cells are over-irradiated, the tumor will temporarily but rapidly decrease in size, but the excessive amount of decomposed products will act on the body as "toxin", bringing about so-called radiation toxicosis (formerly called radiation hangover) and deterioration of the general physical condition, such as anorexia, hematologic changes (leucopenia, abnormal protein and salt metabolism) and abnormal laboratory tests. Finally, contrary to expectation, this is followdd by cachexia. It should be noted that this excessive amount of decomposed products affects the production of antibodies. That is, even though the tumor may temporarily decrease in size, the self-defense ability is lost, giving rise to early metastasis and various other disturbances. These unfavorable results evidently suggest that the current practive of radiation therapy of cancer is erroneous. It has now become the apparent aim of radiation therapy to destory cancer cells to the adequate level through proper irradiation and to bring about anti-cancer status through the intensive secondary biological action, or more specifically to cause a proper level of cell death.

It is very vital to administer the proper dose of radiation, but how can this be accomplished? As irradiation inevitably causes cells to degenerate and die, it is not necessarily difficult to administer the proper dose so long as a massive dose is not given at one time. In view of the fact that studies have not demonstrated the need for massive single dose, I determine a daily dose not causing any "discomfort" to the patient and give it in divided doses to bring about a high cumulative dose. For example, in a gastric cancer patient, at present I give as pre-operative irradiation a daily fractional dose of 50 r—100 r to the focus (skin dose of 100 r—200 r) for a total dose of 1500 r—2000 r. For large tumors I use the multiple small field simple fractional dose procedure. Our newly developed criterion is employed in evaluating the effect of irradiation, but the results of our method have also been confirmed by histological examination of the extirpated tissue. For tumors of other sites a daily dose of 200 r—300 r for a total dose of 2000 r—3000 r is usually given. In some cases radiation is given every 2—3 days rather than daily to avoid unnecessary effect on the patient.

The foregoing describes the cancer therapy developed on the basis of the fundamental mechanism of the biological action of radiation. However, for cancers of the early stage and superficial cancers (that is of nose, throat, ear, skin, female organs) massive doses of radiation are sometimes administered with the aid of destroying all cancer cells directly by the primary action of radiation without any regard or ignoring the aforementioned secondary biological action. I have experienced very favorable results with this procedure, but these are limited to special cases, chiefly cancers of the early stage. In these special cases in which massive doses of radiation prove successful, it may be considered that the radiation beam was substituted for surgery or cauterized the cancer. This cannot be radiation therapy in the true sense, but in applying it to cancers of the mouth and skin I have also obtained good results.

In summarizing the foregoing, it can be assumed that radiation therapy of cancer is a type of active immunity therapy. This is the reason why in the treatment of cancer we must move from radiation therapy to cancer immunity therapy.

On the basis of the aforementioned research results, work is in progress toward passive immunity

therapy of cancer of the terminal stage. A preliminary report will be persented.

It is not an understatement to say that the results of treating cancer patients are governed from 60% to 70% by fate. "Early diagnosis-early treatment" does not imply that a treatment method has been established for cancer, but merely suggests an ideal in treating diseases of any kind. If cancer is discovered at the early stage and treated at the early stage the results are generally good, but if not, nothing can be done at the present time.

As described earlier, in some cancer patients after radiation therapy reduces the size of the tumor, the general physical condition is improved and life is extended. These are confirmed to cases having self-defense ability, that is to cases in whom therapy is possible. However, in cancer cases of the intermediate and terminal stage, the regular therapeutic procedure of pre-operative irradiation and therapeutic transplantation has no significance and on the contrary in some cases it induces early death. This applies to all cancer patients and thus it is natural that favorable results cannot be obtained by the current thereapeutic procedure which does not give any consideration to the self-defense ability of the individual patient. In reviewing those cancer cases in whom the results were favorable, it was found through laboratory tests that their self-defense ability had not been impaired. The results of cancer treatment are influenced only from 20% to 30% by therapeutic procedure, clearly indicating how feeble is medical care for cancer. Nonetheless, patients with terminal stage cancer cannot be neglected, but nothing could be done for these cases to this date. Cancer immunity therapy was evolved from the auto-antibody theory and therefore the last alternative available for cancer treatment is, I believe, passive immunity therapy. In pursing studies on passive immunity therapy I have developed the following two methods which are at present being applied clinically. It is the aim of passive immunity therapy to produce antibodies against cancer not within the individual's body but to produce them elsewhere for application on the individual.

(1) In the first method, humans are used. This I have called blood transfusion method.

(2) In the second method, antibodies are produced in animals and then purely isolated. This I have named antibody isolation method.

As the details are published in Hiroshima Igaku, Vol. 18, No. 11—12 (Journal of the Hiroshima Medical Aasociation) under the title "Active and Passive Immunity Therapy of Cancer", only the general outline will be given here.

(1) In the blood transfusion method, the quick-frozen cancer tissue is transplanted on another individual with compatible blood type and the antibodies produced in this individual are returned to the original patient by blood transfusion.

(2) In the antibody isolation method, antibodies produced in an animal are purely refined and then employed. Here, homogenate or vaccine produced from the quick frozen cancer tissue is injected into the breast of milk cow or goat and about 2—3 weeks later antibodies in the form of lactoglobulin are secreted in the milk. They are used after refining.

In both methods, the help of a surgeon is required in extirpating the cancer tissue from the patient, while the support of a biochemist is needed in the chemical processing of lactoglobulin. We now have available both the quick frozen cancer tissues and the test animals.

On the basis of the results obtained during the last 30 years from experimental and clinical studies and observations, I have devised a most logical therapy for cancer.

It is not an exaggeration to say that the effect of treatment of cancer patients is dependent more on

the self-defense ability of the patient himself than on the therapeutic method employed. It depends largely upon whether or not the patient himself has the ability to recover, whether or not he possesses what are called anti-cancer factors, and whether or not he is predisposed to cancer. These, as explained earlier, are governed by fate. The heretofore therapy for cancer gives little concern to self-defense ability, though most vital to cancer therapy, and therefore once a patient is diagnosed to have cancer, massive doses of radiation and surgery are invariable administered. This, being a reckless procedure, cannot, I believe, always bring about favorable results.

I therefore have developed a criterion of my own to evaluate the effect of irradiation which is not dependent on the heretofore criterion based on histological findings. In carefully studying the clinical findings brought about by the destruction of cancer cells by pre-operative irradiation, irradiation serving as a stress test introduces a number of changes. As described in an earlier report, the results of pre-operative irradiation can be classified into three types according to (1) improvement of clinical conditions (2) reduction of tumor size and (3) normalization of laboratory test results. In reviewing the results we have obtained according to the foregoing three types, type I should the best results, followed by type II and type III with the poorest results.

As the evaluation of the disease by pre-operative irradiation can be simply made by observing the clinical findings during the course of our regular cancer therapy, this method may be said to be a great discovery. Using this evaluation criterion we have been able to estimate the selfdefense ability of cancer patients and have obtained good results.

By summarizing these various new findings, it can be assumed the development, growth and even therapy of cancer are always governed by the immunity of the cancer patient. This brings to mind the famous statement made by Professor Caspari to the effect that "Die Disposition ist das Spiegelbild der Immunitat."

In reviewing the literature, the 600 odd cancer patients who spontaneously recovered as reported by Kidd, Cole, Everson et al. are especially noteworthy. During the last 30 years I have experienced 24 cancer patients who spontaneously recovered. Furthermore, there has been an evident improvement in results through this new therapy, attributable to the many cases in whom life was extended to the level not experienced before. Further review of these cases suggests that cancer develops from the individual's cells, that is from abnormal cells of the body. Therefore, if the individual develops a generalized anti-cancer status, the abnormal cancer cells might become normalized. For example, the undifferentiated cells might mature and remain or might lose their malignant character and disappear. The development of cancer is still a riddle and the process of therapy might also be enveloped in a riddle. It might be possible that no only the development but also course and therapy are governed by immunity.

For cancer patients belonging to type I and type II classified according to the condition of cancer, pre-operative irradiation will strengthen the self-defense ability of the cancer patient and introduce anti-cancer status, while after surgery antibody titer can be maintained by therapeutic transplantation of cancer tissue. If this condition can be maintained for an extended period, the cancer cells would have to change their abnormality and spontaneous recovery would be brought about. Inasmuch as radiation therapy of cancer is effective, I have firm conviction that this theory would be established.

Surgical removal of cancer tissue immediately after diagnosis leads to recovery only in cancer of the early stage. It should be emphasized that surgical removal alone cannot bring about cure, and in this

sense cancer therapy has come to an important turning point. I wish to stress that in the treatment of cancer be it radiation therapy or surgery the factor of "immunity" must be taken into consideration.

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