ANATOMY OF A COVERUP

SUCCESSFUL SLOAN - KETTERING AMYGDALIN (LAETRILE) ANIMAL STUDIES

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Commentary and Analysis:
by Ernst T. Krebs

Revised Edition
Second Printing

THE COMMITTEE FOR FREEDOM OF CHOICE IN CANCER THERAPY, INC.
146 MAIN STREET • SUITE 408 • LOS ALTOS, CALIFORNIA 94022 • (415) 948-9475

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COMMITTEE

PRESS RELEASE

THE COMMITTEE FOR FREEDOM OF CHOICE IN CANCER THERAPY, INC.
146 MAIN STREET • SUITE 408 • LOS ALTOS, CALIFORNIA 94022 • (415) 948-9475

FOR IMMEDIATE RELEASE

September 5, 1975

LOS ALTOS, CALIFORNIA—Apparently suppressed reports of tests of the controversial substance Laetrile on mouse cancer reveal Laetrile's effectiveness—despite statements to the contrary by the research institution in which the tests were carried out.

This was the claim made today by the Committee for Freedom of Choice in Cancer Therapy, Inc., as it released hitherto unpublished reports from the Memorial Sloan-Kettering Cancer Center in New York.

Robert W. Bradford, committee president, said that the six mouse cancer tests conducted by Dr. Kanematsu Sugiura at Sloan-Kettering from 1973 to 1975 had been "leaked" to the organization by "persons unknown" at the center.

But Dr. Sugiura confirmed that the work—which reveals that Laetrile effectively blocked the spread of cancer in specially bred mice without destroying "primary" tumors themselves—is his.

A note on Sloan-Kettering letterhead stationery sent last month with copies of the Sugiura research to Mike Culbert, a former California newspaper editor and now editor of Committee for Freedom of Choice publications, stated that "due to political pressure these (mouse test) results are being suppressed."

Dr. Sugiura said he had not written the note.

In August, spokesmen at Sloan-Kettering announced that repeated tests, including independent outside efforts, had failed to confirm an earlier 1973 Sugiura test which had indicated the same pattern: Laetrile's effectiveness at halting the spread of cancer in specially bred mice.

Laetrile, an extract of the chemical amygdalin from apricot kernels and whose natural form occurs in over 1,200 plants, has been indirectly banned from interstate shipment by the Food and Drug Administration for over a decade and specifically banned from use in cancer treatment by California law.

The center of a long-standing controversy, the substance is legal in 23 other countries, the nearest being Mexico, which thousands of American cancer patients visit annually seeking Laetrile treatment. Despite many thousands of testimonial claims made for the substance's efficacy, American medical orthodoxy has long claimed that there is no objective evidence of Laetrile's efficacy either in treating or preventing cancer.

Along with the allegedly suppressed six Sloan-Kettering studies, Bradford also released a detailed commentary on the same by San Francisco biochemist, Ernst T. Krebs, Jr., the scientist who developed and named Laetrile and who has fought for its vindication as a cancer-fighter since 1949.

Dr. Krebs, who also discovered and anmed Vitamin B15, noted:

"Those who recognize as overwhelmingly important and decisive the criterion of the total inhibition of metastases from a primary tumefaction

see in Sugiura's findings a 70 percent total inhibition of such metastases in Laetrile-treated mice, as compared to controls, an experiment that at present not only proves the antineoplastic action of Laetrile, but proves it with a total success rate of at least 70 percent."

The controversial biochemist, who has argued that Laetrile is actually Vitamin B17 and that cancer is a dietary-deficiency disease, argued that current medical guidelines which define anti-cancer activity through measuring the effect of cancer drugs on the size of tumors are misleading.

They are misleading, he said, because the general rule is that the larger the tumor the less percentage there is of actual cancer tissue in it.

Claims made for Laetrile are that the substance only attacks cancer cells and halts their spread. The "legal" though admittedly poisonous anti-cancer drugs now in use attack all tissues. The attack frequently leads to a reduction in the size of a tumor—and also to a reduction in the overall health and life expectancy of the cancer patient, Krebs added.

It is the blocking of the spread of cancer—metastasis—and the subsequent increase in the feeling of well-being wherein lies Laetrile's effectiveness, Krebs noted, pointing out that all the Sugiura tests referred to just such results with the specially bred mice.

Pro-Laetrile forces have been arguing for decades that there is no reason "clinical" (that is, human) tests for Laetrile are not carried out, leading to its full acceptance and legalization in the United States.

Bradford, whose "freedom of choice" group claims about 20,000 members, including 600 physicians, and more than 300 chapters nationwide, said:

"Here we have further overwhelming evidence of the efficacy of Laetrile—and, sadly, further evidence of its apparent suppression in this country. We wonder how many thousands of mice must be saved by Laetrile before the product is made legally available for humans."

Bradford, by profession an engineer, also released copies of correspondence between Sloan-Kettering and Dr. Mario A. Soto de Leon, an oncologist of the 20 de Noviembre Hospital in Mexico City, which refers to a joint effort for planned human tests for Laetrile in Mexico. The tests never took place.

"If, as Sloan-Kettering keeps saying, no efficacy from Laetrile use was ever noted, then why were such human tests ever planned?" Bradford asked.

"We call on Sloan-Kettering to explain why animal studies indicating Laetrile efficacy are being suppressed, and why tests on humans, while planned, never took place," he added.

Culbert, to whom the Sugiura reports were released, is the author of Vitamin B17: Forbidden Weapon Against Cancer (Arlington House, 1974).

For more information, contact: The Committee for Freedom of Choice in Cancer Therapy, 146 Main Street, Suite 408, Los Altos, California 94022

Telephone: (415) 948-9475

Enclosures:
1. Sugiura Reports
2. Mexico Sloan-Kettering letters
3. Krebs report
4. The Choice

II

ANATOMY OF A COVERUP

ANATOMY OF A COVERUP

The controversy over the substance Laetrile as a cancer-fighter had been raging since at least 1950 before the advent of a turning point in 1972.

Until that time, Laetrile (amygdalin, Vitamin B17) had seemed doomed: rubbing up against the powerful pharmaceutical-medical-governmental establishment, it had been found wanting and classed as quackery, despite the fact that Laetrile already had thousands of testimonials to its benefit, had reached full legal status in 23 other countries and was the subject of solid scientific research.

The controversy had simmered on-again, off-again until July, 1972, when the Committee for Freedom of Choice was formed following the arrest of a California doctor on "cancer quackery" statute violations involving the use of Laetrile in cancer treatment.

The formation of the Committee for Freedom of Choice caused the turnaround in the Laetrile controversy:

First, hundreds and then thousands of irate citizens grouped themselves under the Committee for Freedom of Choice in Cancer Therapy in defense of doctors and against the legislation which, they believed, denied them both freedom of choice in therapy and also intruded into

the privacy of the doctor-patient relationship.

Secondly, the plight of other embattled medics wishing to be true to their Hippocratic oaths, and the advent of a strong grassroots backlash against the Gestapo-like powers of the "establishment" in medical matters, brought the entire controversy over Laetrile back to the surface again.

The dam began to break: by 1973, scores of U.S. doctors were admitting either interest in or use of Laetrile. Doctors were winning their court cases. Thousands of new testimonials to the efficacy of Laetrile were being logged. An originally hostile press was beginning to take renewed interest in "the apricot-pit cancer cure." Pro-Laetrile and pro-natural health organizations were flourishing.

A grassroots movement, the Test Laetrile Now Committee, was underway gathering signatures to then President and Mrs. Richard Nixon urging the full scale testing of the substance on humans, despite the fact that, extraofficially, it had been "tested" thousands of times in the U.S.A.

At the same time, it was announced that the Memorial Sloan-Kettering Cancer Center in New York, perhaps the most prestigious cancer research facility in the world, had undertaken the scientific testing of the compound, reportedly at the behest of Benro Schmidt, a New York investment banker tabbed by Nixon to head the President's Cancer Panel—the board of directors, so to speak, of the "War on Cancer."

Schmidt was asked later what had prompted him to approach Sloan-Kettering for the test program. His response:

"I have had more mail since I've been chairman on the subject of Laetrile than on any other single subject—virtually equal to all the mail on all subjects put together. There is a very considerable traffic in Laetrile....My only interest in Laetrile is that we find out for an absolute certainty what it does or does not do."

The first view of what was going on at Sloan-Kettering in tests of amygdalin on selected strains of mice came out at a Committee for Freedom of Choice press conference: the report "leaked" from the New York institution on a series of tests conducted by veteran scientist, Kanematsu Sugiura, indicating initially positive results.

The report spoke of results gleaned over a 10-month period during which doses of the substance caused "significant inhibition of spontaneous tumors" as well as "significant inhibition of the formation of lung metastases," and it was noted that Laetrile "possibly prevents, to an uncertain degree, the formation of new tumors."

Sloan-Kettering was justifiably irked that a "leaked" report had gotten out. Within months, the institute, in the first of a series of statements on the Laetrile affair, announced that a second series of tests had been unable to confirm Dr. Sugiura's original tests, but that research was continuing.

A battle of statements and press releases then ensued. Laetrile champions were certain that history cannot be rewritten and that the early tests could not simply be brushed aside. The statements of officialdom—The Food and Drug Administration, the National Cancer

Institute, the American Medical Association and the American Cancer Society—continued to be to the effect that Laetrile simply had never been demonstrated as an effective anti-cancer agent despite considerable testing.

In the wings, however, lurked Dr. Dean Burk, one of the founders of NCI and, until his retirement in 1974, head of that organization's cytochemistry division, a well credentialed savant eminently qualified to discuss his subject matter. Burk's routine assessments of NCI-sponsored and otherwise officially sanctioned tests on Laetrile were simply that the government was lying.

"Once any of the FDA-NCI-AMA-ACS hierarchy so much as concedes that Laetrile antitumor efficacy was indeed even once observed in NCI experimentation, a permanent crack in the bureaucratic armor has taken place that can widen indefinitely by further appropriate experimentation," he said, while accusing medical orthodoxy and officialdom of "obfuscations, red herrings, misrepresentations and outright lies."

Dr. Burk, who had run tests on the substance himself, consistently and convincingly argued that Laetrile test statistics on animals revealed the very reverse of what the "experts" claimed they revealed and hence made a case for Laetrile testing on humans.

Part and parcel of the problem was the well-intentioned amendment to the Food, Drug and Cosmetic Act in 1962 whereby any substance to be "cleared" for use on humans must be demonstrated both safe and effective before it may be licensed. This enormous new legal loophole allows

"wanted" drugs to be approved but keeps unwanted ones out. It also vastly increases the amount of red tape needed to license a new medication. This can be seen in the case of, say, Parke-Davis alone. In 1948 this well-known pharmaceutical firm had to submit 73 pages of evidence to secure the licensing of a drug. By 1968 the same company had to submit 72,200 pages of data, transported by truck, in an effort simply to have an anestetic licensed.[1]

In the meantime, Laetrile had been presented with a classic Catch-22 situation:

American medical authorities confessed skepticism of foreign work with the substance and expressed the desire for American doctors who had information on good results with Laetrile to step forward with their evidence. However, since 1963 Laetrile had been indirectly banned by provisions of the Food, Drug and Cosmetic Act from interstate shipment and sale and, in California, specifically banned by state law. Hence, doctors stepping forward with information were quite openly risking themselves legally and, when not legally, professionally by state boards of medical examiners which held Laetrile to be quackery.

On top of that, since the vast majority of patients in the U.S. who turned to Laetrile only did so after orthodox therapy—cutting, burning and poisoning—had given up on them, the results from Laetrile use here or anywhere else were open to question. If the results were

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[1]Walter S. Ross, "The Medicines We Need—But Can't Have," Reader's Digest, October, 1973.

good, "spontaneous remission" or "response to earlier, orthodox treatment" or, at least, a "sugar-pill effect," could be argued. If they were bad, then they could be written off as "another failure for Laetrile."

And also in the meantime, terminal cancer victims on whom "the best treatments available" had given up were left with the prospect of either dying or desperately clutching at a straw of hope and, if they had the money, literally fleeing to Mexico, West Germany or some other place where access to the simple extract of apricot kernels was available. To make the latter decision has of course meant that many cancer sufferers have been treated like common criminals for being provided abroad with a substance not "cleared" by FDA red tape.

This was the background to the Sloan-Kettering selected mouse tests whose first "leaked" report opened this new phase of the Laetrile War in 1973.

By the end of 1974, newspaperman and writer, Mike Culbert, learned that a third series of animal studies had indeed confirmed the first series and that the failure of the second series at S-K was apparently due to a difference in material (between Mexican and West German production). He had just authored Vitamin B17: Forbidden Weapon Against Cancer and wanted the facts straight: that a third series of tests had confirmed the first, that tests of the substance on humans, probably for analgesic effects, were right around the corner. This was confirmed to him in October, 1974, at Sloan-Kettering.

For months, Laetrile boosters waited for official word from Sloan-Kettering. Intermittent contacts with S-K brought only the standard responses that tests were continuing. The responses from FDA, AMA and ACS continued to be that Laetrile was worthless—"not a shred of efficacy," as the FDA commissioner put it.

A Sloan-Kettering vice president told Canadian national television in January 1975 that "we have seen results that seem to be significant" in the Laetrile tests. Another Sloan-Kettering officer was quoted as saying that there was no indication of efficacy, and then slightly amended the original quote. Confusion at the level of the press release seemed to be the order of the day. All the time, a thousand Americans per day continued to drop deal of cancer, whose national fatality statistics had reached record high level in the nation whose best orthodox science could hold out little more than a less-than-gambler's chance for a 7.5% 5-year survival chance in the case of most metastasized cancer through the painful, disfiguring and expensive cut-burn-and-poison approach.

In July, 1975, Sloan-Kettering, through in-depth articles in The New York Times, made the global and apparently final announcement:

"Four cancer research centers working under Federal grants have been unable to confirm assertions that the contraband drug Laetrile can cure cancer or inhibit malignant growths, according to previously undisclosed findings of animal studies."

Moreover, S-K personnel were quoted to the effect that the idea

even of testing Laetrile for analgesic benefits on humans had been discarded.

This was deeply interesting, for the Committee for Freedom of Choice in Cancer Therapy already had copies of correspondence between Sloan-Kettering and 20 de Noviembre Hospital in Mexico City in which plans for actual human (clinical) studies with Laetrile were being planned! (See appendix.)

An NCI official was quoted as saying that "the push behind Laetrile...is financial and political. If we did a clinical (human) trial, it would legitimize the drug and its use would increase a hundredfold."

This was the situation, then, as of August, 1975: S-K's claim that its earlier Laetrile tests had not been confirmed by outside studies (the first tests were referred to as "spurious" and "curious" in Times coverage). There was a hint that many different studies had been conducted—as indeed they had.

Then another "leak" occurred:

Mike Culbert was sent, in August, a copy of six series of Laetrile mouse tests conducted by the veteran Dr. Sugiura. A cover letter to him on Sloan-Kettering stationery, but anonymous, claimed the results mentioned within were being suppressed. A check with Dr. Sugiura confirmed that the tests were indeed legitimate but that he had not sent the letter (see appendices). The tests cover research from March 1, 1974, to February 8, 1975.

The tests are significant for several reasons:

First, they put the lie to the statements by officialdom that Laetrile tests have never uncovered a "shred of efficacy" in cancer treatment.

Second, they indicate that at least seven series of mouse tests with amygdalin (Laetrile, Vitamin B17) have indicated a "shred of efficacy."

Third, they strongly suggest that somebody somewhere is terribly interested in not publishing all the facts about Laetrile and animal studies. It is not the purpose of this preface to speculate about who or why, or even to point fingers at the famed Sloan-Kettering Institute itself. But the lay public has clearly not been told the whole truth about Laetrile.

We must bear in mind, rationally, that what Laetrile does or does not do in animals is by no means conclusive as to what it does or does not do in humans. The animals involved are specially bred and the tumor systems are massive in nature.

To be concisely, precisely "clean" in the matter of semantics, the Committee would agree that if the only indication for the validity of a cancer drug is the measurement of a tumor, following the drug's administration, then—again, in a very strict semantical sense—Laetrile can be said to have at least partially failed in the referred-to tests.

But that is by no means the whole—or even the real—story. As Dr. Ernst T. Krebs, Jr. explains in the accompanying study of what the mouse tests show:

• Laetrile attacks only cancer tissue. It is "poisonous" only to cancer, unlike the "legal" and "orthodox" chemotherapeutic and/or radiation agents which are toxic to the entire metabolism.

• The bigger the tumor, the less the percentage of actual cancer cells per se there are. Laetrile's action, theoretically, is limited only to malignant cells. The "index of tumefaction"—measurement of a lump or bump, in layman's terms—may very well be measuring the effect of the total poisoning of the tumor, cancer and normal cells alike. Hence, in a person treated with "orthodox" modalities, a decrease in a lump or bump may be noted (as it may be noted in Laetrile administration, too), but that index says little about cancer as a systemic or metabolic disease.

• What the reports show, in (now) all seven sets (of the tests which have been "leaked" to the Committee) is that amygdalin administration OBVIOUSLY BLOCKED THE SPREAD OF MALIGNANCY!

The case made by Krebs and a growing phalanx of Laetrile researchers around the world is this:

Amygdalin (Vitamin B17, Laetrile) prevents cancer, first and foremost. In the event there is clinical cancer, it is the best available tool for fighting cancer because it helps block existing cancer and often effectively stops the spread (metastasis) of the disease. No claims of "cure"—but rather of "control" are made for the substance. No claims that Laetrile can restore damaged tissue are made. No "miracle" is offered. Even so, the number of total recoveries with Laetrile-based therapy is increasing—and Laetrile's capacity as an

analgesic is being accepted by hundreds of doctors.

No credible case can be made for stating that there is no efficacy indicated by Laetrile in mouse tests.

Much more importantly, however, we believe there is no credible reason for not going ahead with officially sanctioned amygdalin trials on humans.

The enclosed reports—the seven studies by Dr. Sugiura and the Krebs commentary on them—eloquently make the case for the legal vindication of Laetrile, if in fact it needs any.

Cancer is the number two natural killer in the United States, snuffing out more than 365,000 lives per year. The history of the "war on cancer" shows we are losing that war. In the meantime, a substance which offers efficacy, both in prevention and treatment, has been getting the bureaucratic runaround.

For God's sake, if there is genuine interest in winning the cancer war, let's get on with it.

The issue really is "freedom of choice". WHY are Americans being denied access to an admittedly non-toxic substance?

And most importantly—is it really necessary to wait for human studies? If human tests take as long as animal studies did—and experience indicates they take more time—then we may face the prospect of 5 more years of tests, during which time two million Americans will have died.

No, there is only one rational moral procedure—Freedom of Choice—Amygdalin (Laetrile) should be legal and available NOW!!

III

SLOAN - KETTERING

ANIMAL TEST

MEMORIAL SLOAN-KETTERING CANCER CENTER
1275 YORK AVENUE, NEW YORK, NEW YORK 10021
(212) 879-3000

AUG 2 3 1975

Dear Mr. Culbert:

Here are some the results of Sloan-Kettering's continuing experiments with Laetrile. Due to political pressure these results are being suppressed. Please do your best to bring these important findings to the attention of the people.

Krebs' theory is very promising, and Laetrile should be tested clinically to see if it really holds water.

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Memorial Hospital for Cancer and Allied Diseases
Sloan-Kettering Institute for Cancer Research
Sloan-Kettering Division, Graduate School of Medical Sciences, Cornell University

We received 60 female CD_8F_1 mice from Dr. Daniel S. Martin of the Catholic Medical Center of Brooklyn and Queens, New York, on May 4th 1973 for our experiment with Amygdalin. These female mice were born in December 1972.

We separated these mice into two groups--30 mice for controls which received daily intraperitoneal injections (except Sundays) of saline for 8 weeks or more and the other 30 mice received 2000 mg/kg/day/mouse of Amygdalin for the same period. These animals were weighed once weekly and examined for development of tumors. About 30% of these animals were pregnant.

The purpose of this experiment will be to find out the effect of Amygdalin on the development of spontaneous mammary cancer and lung metastases. The experiment was started on May 8, 1973.

On May 8 to July 9 (62 days) both control and experimental animals maintained body weight well. General health and appearance of Amygdalin-treated animals and that of the controls were good. However, 5 of 30 mice in the experimental group died during this period. Therefore, the dose was reduced to 1000 mg/kg/day. The sudden deaths of these animals might be due to the insertion of the needle into the intestine or uterine horn of these pregnant mice. Therefore, 1/2 inch, 23 gauge hypodermic needles (Becton, Dickinson and Company) were changed to 1/4 inch needles.

During the course of experimenting, we determined the effect of oral administration of Amygdalin on mice.

Each test consisted of 2 Balb x C57 Bl. mice. Amygdalin solutions were given once daily. Results showed that oral administration of 2000 and 1000 mg/kg/day of Amygdalin caused the death of animals in 1 hour. With a dose of 500 mg/kg/day animals lived for 1 hour but died between 2 to 3 hours after oral administration. All animals showed lung hemorrhage. With doses of 250, 100, and 50 mg/kg/day animals lived indefinitely.

Daily examination of Amygdalin treated animals and control animals (August 2, 1973 or 86 days since the start of the experiment) revealed no evidence of development of spontaneous mammary tumors in these animals. In August the mice will be 8 months old, and I expect appearance of spontaneous mammary tumors in the control group.

Histological examinations of mammary tumors of the First Experiment (September 12, 1972 show all adenocarcinomas. Tumor cells of untreated controls are very active and have many mitotic figures. On the other hand tumor cells of Amygdalin treated animals are not very active, more hemorrhagic and degenerated and contain less mitotic figures.

Histological examinations of lungs of the control animals and Amygdalin-treated animals for lung metastases revealed good agreement with that of gross findings.

I will prepare shortly an observation summary on the effect of Amygdalin on spontaneous mammary tumors in Swiss albino mice.

Kanematsu Sugiura

August 3, 1973

SLOAN-KETTERING INSTITUTE *for* CANCER RESEARCH

DONALD S. WALKER LABORATORY, 145 BOSTON POST RD., RYE, N.Y. 10580 OWENS 8-1100

Effect of Amygdalin on Spontaneous Mammary Tumors in CD_8F_1 Mice

This report consists of observations on the effects of prolonged treatment with Amygdalin (SK 1691B) on the growth of spontaneous mammary tumors (adenocarcinomas) in female CD_8F_1 mice. The diagnoses of the tumor tissues were made from biopsied tissues or by postmortem microscopic examination of tissues at the end of the experimental period. The controls received carboxymethylcellulose (CMC) daily and the experimental animals received 1000 mg/kg/day of Amygdalin daily intraperitoneally (6 times weekly). The animals were kept on a normal diet (Purina Laboratory Chow) and water.

The results obtained in the September 12, 1972 experiment are summarized in Tables 1 and 2. Nine control mice with 17 tumors (2.8 x 2.1 cm., the largest to 0.9 x 0.6 cm., the smallest) and ten experimental mice with 15 tumors (1.8 x 1.5 cm., the largest to 0.7 x 0.9 cm., the smallest) were used.

Mouse No. 4 died within 7 days after start of the experiment, and therefore, it was not included in the results.

Table 2 shows that repeated intraperitoneal injections of 1000 mg/kg/day of Amygdalin for 2 to 15 weeks failed to destroy the spontaneous cancer in mice. However, it caused an inhibition in about 50 percent of the tumors. It also shows Amygdalin had a strong inhibitory effect on the development of new tumors and on lung metastases (11% against 89%) in mice. The general health and appearance of the Amygdalin-treated animals with tumors was much better than that of the controls.

Kanematsu Sugiura

Kanematsu Sugiura
March 1, 1974

Table 1

CD_8F_1 Mammary Tumors (Adenocarcinomas) Controls

Mouse No.	Size of tumor (cm)	No. of injections	Duration of experiment (days)	Tumor growth	Final tumor size (cm).	Lung metas.*	Terminated
1	0.2 x 0.2 0.8 x 1.0 11/7‡	65	77	all grew	4.3 x 2.9 1.5 x 1.7	++	died
	0.9 x 0.6	72	86	grew	4.7 x 3.0	++	died
3	1.1 x 1.0 0.9 x 0.7 9/19 0.8 x 0.8 9/26	59	64	all grew	2.6 x 2.5 1.8 x 2.7 3.6 x 2.9	+	died
4	2.6 x 3.0	2	2	grew	3.0 x 3.5	-	died
5	1.5 x 1.2 0.8 x 1.0 10/24	39	46	all grew	4.3 x 3.7 1.0 x 1.0	++	died
6	1.3 x 0.9	79	92	grew	4.4 x 3.6	+++	died
-	2.8 x 2.1	17	20	grew	4.4 x 2.8	-	died
8	0.7 x 0.5 1.1 x 1.4 10/10	42	50	all grew	3.3 x 3.8 1.9 x 2.4	++	died
9	1.2 x 1.3 0.9 x 1.2 10/17	49	58	all grew	3.1 x 3.7 1.9 x 1.6	+++	died
0	1.1 x 0.9 2.0 x 1.5 9/26 0.6 x 0.6 9/26	17	20	all grew	1.5 x 1.3 3.3 x 2.6 1.4 x 1.6	+	died

Injections of CMC were started on September 12, 1972 and ended December 13, 1972 or when animals died.

* Evaluation of lung metastases: (+++) = More than 10 nodules in the lung.
(++) = More than 5 nodules in the lung.
(+) = Less than 5 nodules in the lung.
(-) = No nodules in the lung.

‡ Date new tumor found.

Table 2

CD8F1 Mammary Tumors (Adenocarcinomas) treated with 1000 mg/kg/day of Amygdalin

Size of tumor (cm)	No. of injections	Duration of experiment (days)	Tumor Growth	Final tumor size (cm)	Lung metas.*	Terminated
1.4 x 1.5 0.7 x 0.8	63	74	all grew	4.1 x 3.1 2.8 x 2.2	-	Died
1.3 x 1.2	18	21	stopped 21d Δ	1.0 x 1.2	-	Died
1.3 x 1.2 0.8 x 1.1 9/14‡	24	28	all grew	1.8 x 1.8 2.9 x 3.0	-	Died
1.0 x 0.6	68	80	stopped 21d	4.8 x 2.7	+	Died
0.7 x 0.9	105	140	stopped 56d	2.5 x 2.8	-	Died
0.9 x 0.9	14	16	grew	1.0 x 1.6	-	Died
1.8 x 1.5	57	66	stopped 21d	4.3 x 2.8	+	Died
0.9 x 0.8	28	32	grew	2.7 x 1.7	+	Died
1.0 x 0.8	29	34	stopped 34 d	1.1 x 0.9	-	Died
0.8 x 0.7 0.4 x 0.4 0.9 x 1.0 9/17 1.1 x 0.7 10/10	42	50	all grew	2.1 x 1.7 1.9 x 1.6 2.2 x 3.1 1.2 x 0.9	-	Died

Injections of Amygdalin were started on Sept. 12, 1972 and ended on Jan. 30, 1973 or when animals died.

‡ Date for new tumor found.

Δ Tumor growth stopped for indicated number of days, then growth resumed.

SLOAN-KETTERING INSTITUTE *for* CANCER RESEARCH

DONALD S. WALKER LABORATORY, 145 BOSTON POST RD., RYE, N.Y. 10580 OWENS 6-1100

Effect of Amygdalin on Spontaneous Mammary Tumors in CD8F1 Mice

On April 13, 1973 we received 20 female CD8F1 mice bearing spontaneous mammary tumors from Dr. D. S. Martin of Catholic Medical Center of Brooklyn and Queens, New York. Fourteen of 20 mice or 70% had already 2 to 3 spontaneous mammary carcinomas, indicating that these mice are older than those used in the previous two experiments (September 12, 1972 and February 20, 1973). Primary tumors in this group were definitely larger than those of the previous two groups.

Ten control mice with 19 tumors (2.6 x 2.4 cm., the largest to 0.6 x 0.5 cm., the smallest) received CMC daily intraperitoneally and 10 experimental mice with 18 tumors (3.4 x 2.7 cm., the largest to 1.1 x 0.8 cm., the smallest) received 2000 mg/kg/day of Amygdalin daily intraperitoneally except Sundays for 4 weeks. Four control animals and 1 experimental animal died within 7 days after start of the experiment and, therefore, they were not included in the results.

The results obtained are summarized in Tables 1 and 2 (April 19, 1973). It shows that repeated intraperitoneal injections of 2000 mg/kg/day of Amygdalin for 4 weeks failed to destroy the spontaneous mammary cancer in mice. All tumors grew normally (see Table 2). However, it shows a strong inhibitory effect on the development of lung metastases in mice - 22% against 100%. The general health and appearance of the Amygdalin-treated animals was much better than those of the controls.

Kanematsu Sugiura

Kanematsu Sugiura
March 5, 1974

CD8F1 Mammary Tumors (Adenocarcinomas) Controls

Size of tumor (cm)	No. of injections	Duration of experiment (days)	Tumor growth	Final tumor size (cm)	Lung metas.*	Terminated
1.5 x 1.4 0.9 x 1.3	31	36	all grew	2.4 x 2.3 1.8 x 1.9	+	Sac.
2.1 x 1.6 0.8 x 0.8 0.8 x 0.7	16	19	all grew	3.0 x 2.4 1.8 x 1.4 1.7 x 1.3	++	Sac.
2.3 x 2.0 2.0 x 1.6	6	7			-	Died
2.0 x 1.7	30	35	grew	4.1 x 3.3	+	Sac.
2.6 x 2.4 0.6 x 0.5	10	12	grew	3.0 x 2.9 0.9 x 0.7	++	Died
1.9 x 1.5	4	5			-	Died
1.8 x 2.6 1.2 x 1.2 1.0 x 1.0	13	15	all grew	2.1 x 3.1 1.5 x 1.6 1.6 x 1.4	++	Died
1.3 x 1.5 0.9 x 0.8 1.4 x 1.15/10‡	30	35	all grew	3.1 x 3.5 1.8 x 1.5 1.5 x 1.4	++	Died
1.6 x 1.6	5	6			-	Died
2.1 x 2.3 1.9 x 1.7	1	2			+	Died

ections of CMC were started on April 19, 1973 and ended on May 24, 1973 or when animals died.

* Evaluation of lung metastases: (+++) = more than 10 nodules in the lung; (++)=more than 5 nodules in the lung; (+) = less than 5 nodules in the lung; (-)=no nodules in the lung.

‡ Date for new tumor found.

CD8F1 Mammary Tumors (Adenocarcinomas) Treated with 2000 mg/kg/day of Amygdalin

Size of tumor (cm)	No. of injections	Duration of experiment (days)	Tumor Growth	Final tumor size (cm)	Lung metas.*	Terminated
1.1 x 1.3 1.4 x 1.3	12	14	All grew	1.4 x 1.7 1.9 x 2.0	-	Died
1.0 x 1.0 1.6 x 1.5	29	35	All grew	1.7 x 2.3 2.4 x 3.7	+	Sac.
1.9 x 1.9 1.2 x 1.4 1.7 x 1.1	14	18	All grew	2.5 x 2.2 2.0 x 1.5 3.1 x 1.8	-	Died
0.9 x 0.9 0.9 x 1.2 5/17‡ 0.8 x 0.6 5/17	25	30	Stopped 7dΔ	1.4 x 1.6 1.1 x 1.5 0.8 x 0.7	-	Died
1.6 x 1.4 1.4 x 0.9	17	21	All grew	2.0 x 1.4 1.8 x 1.3	-	Died
1.5 x 1.6 1.1 x 1.0	6	6	All stopped	1.4 x 1.6 0.9 x 1.0	-	Died
3.4 x 2.7 1.5 x 1.2	26	30	All grew	4.2 x 4.4 2.2 x 1.7	-	Died
1.8 x 1.4	16	19	Grew	3.1 x 2.2	+	Died
1.2 x 0.9 1.0 x 1.0	20	25	All grew	1.6 x 1.5 2.0 x 1.6	-	Died
1.1 x 0.8 1.1 x 0.7 5/3	30	36	Stopped 7d Grew	1.9 x 1.4 1.3 x 1.0	-	Sac.

ections of Amygdalin were started on April 19, 1973 and ended on May 24, 1973 or when animals died.

‡ Date for new tumor found.

Δ Tumor growth stopped for indicated number of days, then growth resumed.

SLOAN-KETTERING INSTITUTE *for* CANCER RESEARCH

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Effect of Amygdalin on Spontaneous Mammary Tumors in CD_8F_1 Mice

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Recently we undertook 3 separate experiments (2/22/74, 3/4/74, and 3/11/74) on the effects of prolonged treatment with amygdalin of Mexican origin and German origin (racemic compound) on the growth of spontaneous mammary tumors (adenocarcinomas) in female CD8F1 mice. Each set consisted of 10 controls receiving 0.5cc of saline daily (except Sundays) intraperitoneally and 10 experimental animals which received 2000 mg/kg/day of amygdalin (Mexican or German). The animals were kept on normal diet (Purina Laboratory Chow) and water.

When primary tumors became large (generally more than 4 weeks from the start of the experiments and having tumors more than 2.5 cm. in diameter) animals are sacrificed and negative lungs are bioassayed (1) for the presence or absence of metastases. However, when animals died the lungs were examined grossly with the aid of a magnifying glass and histologically for metastases.

It is interesting to note that 29 negative lungs examined by bioassay 5 or 17% developed tumors or incorrectly diagnosed by gross examinations. Therefore, the positive lung metastases were corrected in the results.

The results in the February 22, 1974 experiment in respect to lung metastases are summarized in Tables 1, 2 and 3.

The Table results show that repeated intraperitoneal injections of 2000 mg/kg/day of Amygdalin for 4 to 9 weeks had a strong inhibitory effect on the development of lung metasatses.

Controls=8 positive, 2 negative or 20% no metastases; amygdalin (Mexican)=3 positive, 7 negative or 70% no metastases; amygdalin (German)=2 positive, 8 negative or 80% no metastases.

The preceeding experiment (February 22, 1974) was repeated (March 4, 1974) using 30 female CD_8F_1 mice bearing spontaneous mammary tumors. Controls received saline daily except Sundays and experimental animals received 2000 mg/kg/day of amygdalin (Mexican) or amygdalin (German) daily intraperitoneally.

The results obtained in the March 4, 1974 experiment in respect to lung metastases, are summarized in Tables 4,5 and 6.

The Table results show that repeated intraperitoneal injections of 2000 mg/kg/day of amygdalin for 4 to 9 weeks had a strong inhibitory effect on the development of lung metastases. Controls=8 positive, 1 negative or 11% no metastases; amygdalin (Mexican)=2 positive, 7 negative or 78% no metastases; amygdalin (German)=3 positive, 7 negative or 70% no metastases.

The results in the March 11, 1974 experiment in respect to lung metastases are summarized in Tables 7, 8 and 9.

The Table results show that repeated intraperitoneal injections of 2000 mg/kg/day of amygdalin for 4 to 9 weeks had a strong inhibitory effect on the development of lung metastases. Controls=9 positive, 1 negative or 10% no metastases; amygdalin (Mexican)=4 positive, 5 negative or 56% no metastases; amygdalin (German)=3 positive, 7 negative or 70% no metastases.

The present 3 experiments show that the anti-lung metastasis activity of amygdalin of Mexican or German product appears to be the same - 68 and 73% no metastases, respectively, against 14% no metastases for controls.

On May 31, 1974, one animal in the control group and 2 animals in the amygdalin (Mexican)-treated group out of 90 animals are still living.

Kanematsu Sugiura

Kanematsu Sugiura
May 31, 1974

1) Anderson, J. C., Fugmann, R. A., Stolfi, R. L., and Martin, D. S. Metastatic Incidence of a Spontaneous Murine Mammary Adenocarcinoma. Cancer Research, 1974 (in press).

Table 1 (First experiment 2/22/74)

CD8F1 Mammary Tumors (Adenocarcinomas) Controls

Mouse No.	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Lung metastasis: Gross exam.*	Lung metastasis: Microscopic exam.	Lung metastasis: Biopsy†	Terminal
1	0.7 × 0.9	2.5 × 2.9	90	+++	+		Sac.
2	0.9 × 1.0	2.0 × 2.4	32	++	+		Died
3	0.4 × 0.4	2.4 × 3.0	55	+	—		Sac.
4	0.8 × 1.3 0.7 × 1.1 (3/8)Δ	1.9 × 2.8 1.0 × 1.6	32	++	+		Sac.
5	1.0 × 0.9	2.2 × 2.8	32	—		—	Sac.
6	1.4 × 1.1	2.9 × 2.4	39	—		—	Sac.
7	1.0 × 1.1 0.9 × 0.7 (5/2)Δ	1.8 × 1.9 3.4 × 2.5	38	++	+		Died
8	1.0 × 0.8	3.9 × 2.8	55	++	+		Sac.
9	0.7 × 0.6 0.4 × 0.4 (5/1)Δ	2.2 × 2.4 1.2 × 1.3	39	+	—		Sac.
10	0.8 × 0.8	2.0 × 2.0	28	+	+		Died

* Evaluation of lung metastasis: (+++) = More than 10 nodules in the lung; (++) = more than 5 nodules; (+) = less than 5 nodules; (—) = no nodules.

† Biopsyed one negative lung in 2 male mice (2 implants in one mouse bilaterally.

Δ Date for new tumor found.

Table 2 (First Experiment 2/22/74)

CD8 F1 Mammary Tumors (Adenocarcinoma) Treated with 2000 mg/kg/day of Cyclophosphamide (Mpfac)

Animal No.	Initial Size of Tumor (cm)	Final Size of Tumor (cm)	Duration of Experiment (days)	Lung metastases: Gross * Appearance	Lung metastases: Microscopic Appearance	Kidney ‡	Terminated
1	0.8 X 0.7	1.8 X 1.4	+7	—	—		Died
2	1.0 X 0.8	2.1 X 1.6	36	—	—		Died
3	0.8 X 0.8	3.0 X 2.7	77	+	+		Sac.
4	1.0 X 0.7	3.3 X 2.6	90	+	+		Sac.
5	0.7 X 0.5	2.2 X 1.4	69	—	+		Died
6	1.0 X 0.7	2.7 X 1.8	55	—		+	Sac.
	0.8 X 1.0 3/4 △	1.6 X 1.6					
7	1.0 X 1.1	1.9 X 2.3	26	—	—		Died
	0.8 X 0.7 3/5 △	0.8 X 1.2					
8	1.1 X 1.0	3.0 X 2.7	75	—		—	Sac.
9	1.1 X 0.9	3.1 X 2.0	28	—		—	Sac.
10	0.9 X 0.8	1.8 X 2.2	59	—	—		Died

*

‡

△

Table 3 (First Experiment 2/22/74)

CD8F1 Mammary Tumors (Adenocarcinomas) Treated with 2000 mg/kg/day of Cyclophosphamide (Geomax)

Mouse No.	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Lung metastasis: Gross appear.*	Lung metastasis: Microscopic appear.	Lung metastasis: Bleeding†	Termination
1	0.8×0.9 △ 0.7×0.7 3/8 ○ 0.8×0.9 3/4	2.2×2.1 1.2×1.3 0.8×0.9	39	—		—	Sac.
2	0.7×1.1	2.2×3.6	55	+++	+		Sac.
3	1.1×0.8 △ 0.7×0.8 3/8	1.6×1.6 2.2×2.6	39	—		—	Sac.
4	1.8×1.3	2.5×2.9	32	—		—	Sac.
5	0.9×1.1 △ 0.4×0.5 3/4	2.4×1.8 2.5×2.1	60	—		—	Sac.
6	0.9×1.1	3.1×2.4	67	—		—	Sac.
7	1.0×1.4	2.7×2.0	32	—		—	Sac.
8	0.8×0.8 △ 1.1×0.9 4/5	2.6×2.3 1.4×1.4	60	—		—	Sac.
9	0.9×0.8	2.3×3.3	51	—	—		Died
10	0.8×1.1	2.3×2.8	55	+++	+		Sac.

*

†

Effect of Amygdalin on the Development of Mammary Tumors (Adenocarcinomas) and Lung Metastasis in CD8F1 Mice.

On May 8, 1973, we started a new experiment to find out the effect of amygdalin (Mexican) on the development of spontaneous mammary cancer and lung metastasis in female CD8F1 mice. At the start of the experiment these mice were approximately 5 months old and had no spontaneous tumors. These mice had at least one pregnancy.

Thirty mice (8 mice were pregnant) for controls which received daily intraperitoneal injections of 0.5 cc saline (6 times weekly) for a prolonged period and the other 30 mice (8 mice were pregnant) received 1000 mg/kg/day of amygdalin daily intraperitoneally for the same period as controls. These female mice were born during December 1972. When tumors developed in these anaimals they were allowed to grow to a large size which took more than 21 days. The presence or absence of lung metastases was determined by gross and histologic examination. The animals were kept on a normal diet (Purina Laboratory Chow) and water.

When animals appeared to be weak due to the presence of lung metastases or due to toxemia from large tumors (2.0 cm. diameter or more) animals were sacrificed and gross examination was made for the presence and absence of metastases.*

Results: Daily examination of amygdalin-treated animals as well as controls (the last examination was made on September 30, 1974 or 510 days since the start of the experiment) revealed development of 19 spontaneous mammary tumors and 2 abdominal tumors in 30 mice among the control group. First tumor appeared on 10/11/73, followed by 12/8/73, 12/20/73, etc., - see Table 1. By September 30, 1974, 21 of 30 control animals developed tumors or 70 per cent. Three of them had second tumors. Of the 18 animals that died or were sacrificed because of large tumors, 14 had lung metastases in various degrees, or 78 per cent. Twelve animals are still alive with or without tumors.

Among 30 experimental animals, 5 animals were killed by accidental injection of amygdalin into the intestine within a short period of time after the start of the experiment and therefore these animals were not included in the results.

On December 28, 1973, one of the amygdalin-treated animals developed a spontaneous mammary tumor or 79 days later than that of the first control tumor, followed by 10 more mice with mammary tumors and one abdominal tumor - on 2/14/74, 3/20/74, 3/22/74, etc., or 48 per cent of animals had spontaneous tumors. Twelve animals died or were sacrificed because of weakness from large tumors. Post mortem examination revealed 3 animals had lung metastases or 25 per cent. Thirteen animals are still alive with or without tumors.

The present study shows that for the three quarters of their life span (21 months) the daily prolonged intraperitoneal injections of a large amount of amygdalin did not prevent the development of mammary cancers in mice completely. However, it had a definite deduction in development of mammary tumors - 70% in controls against 48% in amygdalin-treated mice. It also shows amygdalin had a strong inhibitory effect on the development of lung metastases in mice - 75 per cent inhibiton against 22 per cent in controls. The general health and appearance of the amygdalin-treated animals were as good as that of the controls in spite of 16 months of injections. The body weights of control animals without tumors and that of amygdalin-treated animals without tumors all gained weight. The surviving animals are approximately 21 months old.

* Evaluation of lung metastases:
(+++) = more than 10 nodules in the lung.
(++) = more than 5 nodules in the lung.
(+) = less than 5 nodules in the lung.
(-) = no nodules in the lung.

† Killed by accidental injection of amygdalin into the intestine.

‡ Date for second tumor found.

Kanematsu Sugiura

Kanematsu Sugiura
September 30, 1974

Development of Mammary Tumors (Adenocarcinomas) in CL

Mouse No.	Tumor development: Date of tumor development	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (days)	Lung: Gross exam.
1	5-30-74	0.6×0.8	2.0×2.9	448	86	+
2				510		
3	3-27-74	0.7×0.6	1.1×1.6	~~47~~ 343	47	++
	4-6-74†	1.1×1.0	2.3×2.0			
4	2-5-74	1.0×0.9	2.8×3.7	304	~~34~~ 31	+
5	5-7-74	0.8×0.9	3.1×2.4	401	37	+++
6	5-16-74	0.7×1.2	2.6×3.1	412	39	++
7	4-16-74	0.8×0.9	2.4×2.3	401	58	+
8	6-18-74	abdominal tumor 1.2×1.1	(malignant tumor) 1.7×2.5	468	62	+
9	10-11-73	0.5×0.5	1.9×1.6	224	68	+
	11-14-73†	0.7×0.9	3.0×2.5			
10	3-31-74	0.4×0.3	2.7×2.9	370	43	+
11	4-30-74	0.4×0.5	2.0×2.4	426	95	+
12	9-21-74	0.3×0.2	0.8×0.6	510	9	
13	8-13-74	0.6×0.6	1.1×1.3	510	48	
14	12-18-73	0.6×0.7	4.1×3.1	~~70~~ 284	70	+++
15				139		—
16	5-17-74	0.6×0.7	2.6×3.2	412	38	++
17	3-8-74	0.6×0.6	2.4×2.2	334	30	+
18				510		
19				445		—
20	12-20-73	0.8×0.7	3.6×2.6	272	15	++

Lung Tumors (Adenocarcinomas) in CD8F1 Mice – Control (May 8, 1973 – Sept. 30, 1974)

Mouse size (g)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (days)	Lung metastases: Gross * exam.	Lung metastases: Microscopic exam.	Termination	Δ no. of days
28	2.0 X 2.9	448	86	+	+	Sac.	387
		510				Alive	
26	1.1 X 1.6	~~447~~ 343	47	++	+	Died	323
30	2.3 X 2.0						
29	2.8 X 3.7	304	~~343~~ 31	+	+	Died	273
29	3.1 X 2.4	401	37	+++	+	Sac.	364
32	2.6 X 3.1	412	39	++	+	Sac.	373
29	2.4 X 2.3	401	58	+	—	Sac.	343
28 (multiple tumors)	1.7 X 2.5	468	62	+	—	Sac.	406
25	1.9 X 1.6	224	68	+	+	Died	156
29	3.0 X 2.5						
33	2.7 X 2.9	370	43	+	—	Sac.	327
25	2.0 X 2.4	426	95	+	—	Died	357
32	0.8 X 0.6	510	9			Alive	501
26	1.1 X 1.3	510	48			Alive	462
27	4.1 X 3.1	~~70~~ 284	70	+++	+	Sac.	214
		139		—	—	Died	
27	2.6 X 3.2	412	38	++	+	Died	374
26	2.4 X 2.2	334	30	+	—	Died	304
		510				Alive	
		445		—	—	Died	
30	3.6 X 2.6	272	15	++	+	Died	226

Table 1 (cont.)

Mouse No.	Tumor development: Date of tumor	Tumor development: No. of days	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (days)
21					510	
22					510	
23					510	
24					510	
25	7-26-74	444 ~~0.3×0.2~~	0.3×0.2	0.5×0.6	510	
26	9-3-74 ~~0.3×0.2~~ 444-483		0.3×0.2	0.8×1.5	510	
	9-5-74† ~~0.6×0.8~~		0.6×0.8	1.1×1.0		
27	5-23-74	388 At conclusion	2.3×2.0	2.3×2.1	399	19
28					510	
29	7-19-74	437	0.3×0.7	0.9×1.1	478	41
30	9-3-74	483	0.6×1.1	1.8×2.4	510	27

Table 1 (cont.)

Age	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (days)	Lung metastases: Gross exam. *	Lung metastases: Microscopic exam.	Terminated
			510				Alive
			510				Alive
			510				Alive
			510				Alive
44	0.3 X 0.2	0.5 X 0.6	510				Alive
44-483	0.3 X 0.2	0.8 X 1.5	510				Alive
0.8	0.6 X 0.8	1.1 X 1.0					
58	2.3 X 2.0	2.3 X 2.1	399	19	Reticulosarcoma or lymphoma	—	Sac.
			510				Alive
37	0.3 X 0.7	0.9 X 1.1	478	41	—	—	Died
83	0.6 X 1.1	1.8 X 2.4	510	27			Alive

Table 2

Effect of Amygdalin on the Development of Mammary Tumors and Lung Metastasis in CD8F1 mice (May 8, 1973 – September

Mouse No.	Tumor development		Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time of tumor (found dead)
	Date of tumor	No. of days				
1					456	
2					30	
3	12-28-73	234	1.0 X 0.9	3.5 X 3.6	295	30
4					510	
5					189	
6	7-18-74 8-17-74†	436	0.8 X 1.1 1.0 X 1.1	1.3 X 1.6 2.6 X 2.3	468 ~~293~~	32
7					293	
8					510	
9	8-5-74	454	0.4 X 0.2	1.8 X 2.5	510	56
10					60	
11					51	
12	3-20-74 4-3-74†	316	0.9 X 1.0 0.6 X 0.6	2.8 X 3.2 0.8 X 1.1	356	40
13	6-3-74 6-10-74 †	391	0.9 X 1.4 0.7 X 0.5	2.4 X 3.2 1.3 X 1.6	423	32
14	3-22-74	318	0.6 X 0.7	2.3 X 2.0	378	61
15	8-30-74	479	0.9 X 0.7	1.9 X 2.2	510	31
16					510	
17	2-14-74	479	0.8 X 1.2	2.8 X 4.2	331	49
18	9-12-74	492	0.6 X 0.8	0.9 X 1.7	510	
19					510	
20					510	

Table 2

... on the Development of Mammary Tumor (Adenocarcinomas)

... in CD8F1 mice (May 8, 1973 – September 30, 1974)

...elopment No. of days	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (days)	Lung metastases * Gross exam.	Lung metastases * Microscopic exam.	Terminated
			456	found adenocarcinoma, no primary mammary tumor	+++		Died
			30	tumors in the lungs, no primary tumor			Killed +
234	1.0X0.9	3.5X3.6	295	30	—	—	Sac.
			510				Alive
			189		—	—	Killed +
436	0.8X1.1 1.0X1.1	1.3X1.6 2.6X2.3	468 ~~293~~	32	+	+	Sac.
			293		—	—	Died
			510				Alive
54	0.4X0.2	1.8X2.5	510	56			Alive
			60		—	—	Killed +
			51		—	—	Killed +
316	0.9X1.0 0.6X0.6	2.8X3.2 0.8X1.1	356	40	++	+	Sac.
91	0.9X1.4 0.7X0.5	2.4X3.2 1.3X1.6	423	32	+	—	Sac.
13	0.6X0.7	2.3X2.0	378	61	—	—	Died
74	0.9X0.7	1.9X2.2	510	31			Alive
			510				Alive
79	0.8X1.2	2.8X4.2	331	49	—	—	Sac.
72	0.6X0.8	0.9X1.7	510				Alive
			510				Alive
			510				Alive

Table 2 (Cont.)

Mouse No.	Tumor development		Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (d
	Date of tumor	No. of days				
21					510	
22					510	
23					510	
24	7-18-74	436	0.4X0.6	1.7X 2.4	484	48
25					510	
26					510	
27	8-26-74	Additional tumor 475		2.$\sqrt{2}$X 2.8	507	32
28					50	
29	6-5-74	393	0.4X0.8	2.1X 2.4	435	42
30					10	

Table 2 (Cont.)

Experiment No. of days	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Survival time with tumor (days)	Lung metastases: Gross exam. *	Lung metastases: Microscopic exam.	Termination
			510				Alive
			510				Alive
			510				Alive
436	0.4×0.6	1.7×2.4	484	48	—	—	Sac.
			510				Alive
			510				Alive
475		$2.\sqrt{2}$×2.8	507	32	—	—	Died
			50		—	—	Killed +
393	0.4×0.8	2.1×2.4	435	42	—	—	Sac.
			10		—	—	Killed +

Effect of Amygdalin on Spontaneous Mammary Tumors in Swiss Albino Mice.

This report consists of observations on the effects of prolonged treatment with amygdalin (Mexican) on the growth of spontaneous mammary tumors (adenocarcinomas) in female Swiss-Webster albino mice (Taconic Farms, New York). The diagnoses of tumor tissues were made from a post-mortem microscopic examination of tissues at the end of the experimental period. Occasionally small growths regressed completely under injections of saline or amygdalin. These undiagnosed growths were not included in the results. Spontaneous tumors other than mammary adenocarcinomas were not included in the results. The animals were kept on a normal diet (Purina Laboratory Chow) and water. Since we received only 2 to 5 tumor-bearing mice at each time from Taconic Farms the experimental group and control group were performed separately. The controls received 0.5 cc of saline (S) daily except mouse No. 1 which received 0.5cc of carboxymethyl cellulose (CMC) and the experimental animals received amygdalin daily intraperitoneally (except Sundays).

The results obtained from this study are summarized in Tables 1 and 2. The experimental results in Tables 1 and 2 are in the order of experiments performed. Twenty eight control mice with 35 tumors and 2 new tumors (2.5 x 2.9 cm., the largest to 0.6 x 0.6 cm., the smallest) and thirty five experimental mice with 37 tumors and 5 new tumors (2.4 x 1.9 cm., the largest to 0.7 x 0.7 cm., the smallest) were used.

Table 2 shows that repeated intraperitoneal injections of 1000 to 3000 mg/kg/day of amygdalin for 2 to 18 weeks failed to destroy the spontaneous breast cancers in mice. However, it caused to stop the continuous growth of small tumors (about 1.5 cm. diameter or less) more often than that of the control group - 8 out of 28 tumors in controls stopped growth or 29 per cent against 18 out of 35 tumors in amygdalin-treated animals stopped growth or 51 per cent.

It also shows that amygdalin had a strong inhibitory effect on the development of lung metastases in mice - 77 per cent inhibition against 7 per cent inhibition in controls. Undoubtedly mice with large tumors had lung metastases. It is possible that

these metastatic growths have been destroyed by the repeated treatment with amygdalin. The general health and appearance of the amygdalin-treated animals were much better than that of the controls.

Results obtained with mammary tumors occurring in Swiss albino mice are essentially the same as those obtained with mammary tumors occurring in CD_8F_1 mice - that repeated intraperitoneal injections of 2000 mg/kg/day of amygdalin inhibited the growth of small tumors and development of lung metastases in mice.

Kanematsu Sugiura

Kanematsu Sugiura
February 8, 1975

Footnotes for Tables 1 and 2

* Evaluation of lung metastases: (+++)=more than 10 nodules in the lung; (++)=more than 5 nodules; (+)=less than 5 nodules; (-)=no nodules.

† Amygdalin was dissolved in CMC, elsewhere it was dissolved in saline.

‡ New tumor found, days.

Δ Tumor growth stopped for indicated number of days, then growth resumed.

Table 1

Lewis Miller - Mammary Tumors (Adeno-carcinoma) - Cont'd

Animal No.	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Tumor growth	Lung metastases: Gross exam.	Lung metastases: Microscopic exam.	Type
1	1.0 × 1.7 0.9 × 1.1	3.4 × 3.5 1.8 × 1.5	49	Both grew	+++	+	Duct
2	0.5 × 0.8	1.6 × 1.7	48	Injected 13 d Δ	—	—	Duct
3	1.3 × 1.3	1.9 × 2.8	48	Grew	+	+	Duct
4	1.4 × 1.3	2.8 × 2.3	71	Injected 49 d Δ	+++	+	Duct
5	1.8 × 1.8 1.6 × 0.8	5.1 × 4.4 1.3 × 1.0	51	Both grew	+	+	Duct
6	0.9 × 0.9 * 0.6 × 0.5 9 d	1.7 × 2.2 1.0 × 1.3 9 d *	45	Injected 14 d Δ	+++	+	Duct
7	0.9 × 0.9	5.8 × 4.0	45	Grew	+	—	Duct
8	1.3 × 1.1	1.2 × 1.1	84	Injected 84 d Δ	+++	+	Duct
9	0.6 × 0.6 0.8 × 0.9 24 d *	1.7 × 1.5 1.4 × 1.7	114	Both grew	—	—	Duct
10	1.8 × 1.8	2.7 × 2.7	47	Grew	+++	+	Duct
11	1.2 × 1.6 1.0 × 1.3	2.1 × 2.3 3.8 × 4.9	51	Both grew	+	—	Duct
12	2.0 × 1.5	5.4 × 4.0	40	Grew	+++	+	Duct
13	2.2 × 1.4	3.4 × 3.3	51	Grew	+++	+	Duct
14	1.4 × 1.3 1.7 × 1.6	2.7 × 2.1 2.6 × 2.1	51	Grew	+	—	Duct
15	1.8 × 1.9	3.6 × 3.0	70	Grew	+	—	Duct
16	1.8 × 1.8	3.6 × 2.4	37	Grew	+	+	Duct
17	1.8 × 1.8 1.2 × 1.5	2.5 × 3.1 2.8 × 2.1	37	Grew	+++	+	Duct

Table 1 (cont.)

Controls

Mouse No.	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Tumor growth	Living metastases		Terminated
					Gross exam.	Microscopic exam.	
18	0.9×0.9	5.9×4.1	45	Grew	+	—	Sac.
19	0.9×1.3	~~0.6×1.1~~ 2.4×2.8	~~41~~ 76	~~Stat. fell 41.2~~ Grew	++	+	Sac.
20	1.0×1.4	2.4×2.9	76	Grew	+	+	Sac.
21	0.9×1.3	0.6×0.9	93	Stat. fell 93.2	+	—	Sac.
22	1.1×1.4	~~2.9×2.1~~ 3.8×4.2	~~93~~ 45	Grew	++	+	Sac.
23	1.1×1.7	4.1×4.4	49	Grew	+	—	Died
24	0.9×0.7	2.3×2.1	93	Grew	+	—	Sac.
25	1.5×1.7	0.5×0.5	93	Stat. fell 93.2	+	+	Sac.
26	2.1×1.9	3.0×4.0	42	Stat. fell 14.2	++	+	Sac.
27	2.5×2.6 1.7×1.5	3.5×3.7 3.1×2.5	19	Both grew	++	+	Died
28	2.5×2.9 1.6×1.9	3.5×2.6 2.8×2.0	14	Both grew	+++	+	Died

Table 2

Acute Albino Hamsters by Topical (Adrenocortical) Treated with

Hamster No.	Dose mg/kg/day	Initial Size of Tumor (cm)	Final Size of Tumor (cm)	Duration of Experiment (days)	Tumor Growth	Lung Metastases	
						Gross Exam. *	Microscopic Exam.
1	2000 †	1.6 × 1.3	4.1 × 2.9	40	Grew	—	—
2	1000 †	1.5 × 1.6	2.3 × 2.1	19	Grew	—	—
3	1000 †	1.5 × 1.5	1.3 × 1.7	127	Stopped 127 d Δ	—	—
4	2000 †	1.5 × 1.3	3.3 × 3.6	33	Grew	+	+
5	2000 †	1.9 × 1.4 1.0 × 0.5 22 d ‡	3.2 × 2.3 1.1 × 1.7	35	Both grew	+++	+
6	2000	0.9 × 0.7	1.0 × 0.8	71	Stopped 64 d Δ	—	—
7	2000	1.1 × 0.7	0.7 × 0.7	71	Stopped 71 d Δ	—	—
8	2000	1.6 × 2.1	2.6 × 2.4	20	Grew	—	—
9	2000	1.1 × 0.9	1.8 × 2.4	28	Grew	+	+
10	1000	2.0 × 1.7	1.9 × 1.5	19	Stopped 19 d Δ	—	—
11	3000 †	1.3 × 1.3	2.0 × 2.4	55	Stopped 34 d Δ	—	—
12	3000 †	1.9 × 1.8 0.7 × 1.1	3.0 × 3.1 0.8 × 1.1	29	Both grew	—	—
13	3000 †	1.1 × 0.9	1.3 × 1.0	81	Stopped 69 d Δ	—	—
14	3000	0.8 × 1.2	0.6 × 1.0	11	Stopped 11 d Δ	—	—
15	2000	1.0 × 1.3	0.9 × 0.9	51	Stopped 51 d Δ	—	—
16	2000	1.0 × 1.0	2.0 × 2.3	51	Grew	—	—
17	2000	1.4 × 1.6	3.2 × 3.7	51	Grew	—	+
18	2000	2.0 × 2.0	2.4 × 2.1	23	Grew	—	—
19	2000	1.8 × 1.9 1.9 × 1.4	2.6 × 2.4 4.0 × 3.0	23	Both grew	—	+
20	2000	0.7 × 1.0	0.9 × 1.2	23	Grew	—	—
21	2000	1.1 × 1.5	1.2 × 2.0	12	Grew	—	—

Table 2

Pulmonary Tumors (Adenocarcinoma) Treated with Cryosurgery

Age	Initial size of Tumor (cm)	Final size of Tumor (cm)	Duration of experiment (days)	Tumor growth	Lung metastasis: Gross exam.	Lung metastasis: Microscopic exam.	Tumor
7	1.6×1.3	4.1×2.9	4.0	Grew	—	—	Died
+	1.5×1.6	2.3×2.1	14	Grew	—	—	Died
+	1.5×1.5	1.3×1.7	127	Stayed 127 d	—	—	Sac.
+	1.5×1.3	3.3×3.6	33	Grew	+	+	Died
+	1.4×1.4 ‡ 1.0×0.5 22 d	3.2×2.3 1.1×1.7	35	Both grew	++	+	Died
	0.9×0.7	1.0×0.8	71	Stayed 64 d	—	—	Sac.
	1.1×0.7	0.7×0.7	71	Stayed 71 d	—	—	Sac.
	1.6×2.1	2.6×2.4	20	Grew	—	—	Died
0	1.1×0.9	1.8×2.4	28	Grew	+	+	Died
	2.0×1.7	1.4×1.5	14	Stayed 14 d	—	—	Died
+	1.3×1.3	2.0×2.4	55	Stayed 37 d	—	—	Died
+	1.4×1.3 0.7×1.1	3.0×3.1 0.8×1.1	29	Both grew	—	—	Died
+	1.1×0.9	1.3×1.0	81	Stayed 69 d	—	—	Sac.
	0.8×1.2	0.6×1.0	11	Stayed 11 d	—	—	Died
	1.0×1.3	0.9×0.9	51	Stayed 51 d	—	—	Sac.
	1.0×1.0	2.0×2.3	51	Grew	—	—	Died
	1.4×1.6	3.2×3.7	51	Grew	—	+	Sac.
	2.0×2.0	2.4×2.1	23	Grew	—	—	Sac.
	1.8×1.9 1.9×1.4	2.6×2.4 4.0×3.0	23	Both grew	—	+	Sac.
0	0.7×1.0	0.9×1.2	23	Grew	—	—	Sac.
	1.1×1.5	1.2×2.0	12	Grew	—	—	Sac.

Amygdaline – Treated.

Mouse No.	Dose mg/kg/day	Initial size of tumor (cm)	Final size of tumor (cm)	Duration of experiment (days)	Tumor growth	Lung metastases: Gross exam.	Micro exam.
22	2000	0.4 X 1.4	0.2 X 0.5	41	stopped 41st	—	—
23	2000	1.1 X 1.3 1.5 X 1.6 15th	3.6 X 2.7 1.8 X 1.9	30	Both grew	—	—
24	2000	0.8 X 1.1	0.8 X 0.9	115	stopped 115th	—	—
25	2000	1.1 X 1.4	1.0 X 1.6	112	stopped 91st	—	—
26	2000	1.1 X 1.7	3.4 X 3.5	51	stopped 14th	—	—
27	2000	1.4 X 1.4	1.5 X 2.5	55	stopped 34th	—	—
28	2000	0.9 X 0.9	2.1 X 3.1	38	grew	+	+
29	2000	1.3 X 1.6	1.4 X 2.3	78	stopped 42nd	—	+
30	2000	1.4 X 1.5	2.9 X 2.7	64	stopped 21st	—	—
31	2000	0.7 X 0.7	0.8 X 0.8	78	stopped 78th	—	—
32	2000	1.3 X 1.5 0.8 X 0.6 48th	1.2 X 2.0	78	stopped 49th	—	—
33	2000	0.6 X 0.8 0.7 X 0.7 48th	1.6 X 1.7 1.1 X 0.9	78	stopped 35th	—	—
34	2000	2.4 X 1.9	4.9 X 3.5	30	grew	+	+
35	2000	1.3 X 1.7 0.5 X 0.5 14th	4.1 X 3.2 0.6 X 0.5	24	Both grew	+++	+

Table 2 (Cont.)

Amygdaline-Treated.

Weight (gm.)	Final size of tumor (cm.)	Duration of experiment (days)	Tumor growth	Lung metastasis		Termination
				Gross exam.	Microscopic exam.	
1.4	0.2 X 0.5	41	Stopped 41 d	—	—	Sac.
1.3	3.6 X 2.7	30	Both grew	—	—	Died.
1.6 15d	1.8 X 1.9					
1.1	0.8 X 0.9	115.	Stopped 115 d	—	—	Sac.
.7	1.0 X 1.6	112	Stopped 91 d	—	—	Sac.
1.7	3.4 X 3.5	51	Stopped 14 d	—	—	Sac.
1.7	1.5 X 2.5	55	Stopped 34 d	—	—	Sac.
0.7	3.1 X 3.1	38	Grew	+	+	Sac.
1.0	1.4 X 2.3	78	Stopped 42 d	—	+	Sac.
1.5	2.9 X 2.7	64	Stopped 21 d	—	—	Died
.7	0.8 X 0.8	78	Stopped 78 d	—	—	Sac.
.5 + 15d	1.2 X 2.0	78	Stopped 49 d	—	—	Sac.
+ 15d	1.6 X 1.7 1.1 X 0.9	78	Stopped 35 d	—	—	Sac.
1	4.9 X 3.5	30	Grew	+	+	Sac.
+ 14d	4.1 X 3.2 0.6 X 0.5	24	Both grew	++	+	Sac.

A Summary of the Effect of Amygdalin Upon Spontaneous Mammary Tumors in Mice

Kanematsu Sugiura: September 12, 1972 - June 13, 1973

Dr. Sugiura has performed three sets of major experiments to determine the effects of amygdalin (i.p.) in carboxy methyl cellulose (CMC) upon mice with spontaneous mammary tumors (adenocarcinomas). The mice strain was CD_8F_1. The results of these experiments have been combined and are shown in the Table below, along with pertinent procedural data:

TABLE I

Results of Amygdalin (i.p.) Treatment after Six Weeks

Tumors (varied from 2.8 x 2.1 cm - 0.9 x 0.6 cm)	Controls-CMC alone (28 mice, 28 tumors at start; 23 mice at end)	Amygdalin (1-2g/kg/day in CMC-30 mic 36 tumors at start;23 mice
Growing	27	28
Stopped Growing	1 (3.5%)	8 (22.2%)
Regressing	0	0
Regressed	0	0
New Tumors	11 (37%)	8 (22.2%)
Lung metastases present	18 (78.2%)	4 (17.4%)
Lung metastases absent	5 (21.8%)	19 (82.6%)

The results clearly show that amygdalin significantly inhibits the appearance of lung metastases in mice bearing spontaneous mammary tumors and increases significantly the inhibition of the growth of the primary tumors over the appearance of inhibition in the untreated animals. Laetrile also seemed to prevent slightly the appearance of new tumors but the significance level of this data is questionable.

The three experiments from which this data is pooled differed from each other in certain important ways. In one case the animals were younger and therefore exhibited smaller tumors. These animals were as well given 1g/kg/day. The results of this experiment (roughly contributing one-third of the data) indicated that smaller tumors were more readily inhibited (50%) by amygdalin but that lung metastases were present in greater than average frequency (30%) probably due to the lower dose. The other two experiments employed 2g/kg/day, older animals whose tumors were larger, and which displayed far fewer lung metastases (7%). The rate of appearance of new tumors in amygdalin-treated animals remained constant in the three experiments but varied in the control group. Young control mice show a far greater incidence of new tumors (77%) than old mice (21%).

The mice used in this study were the F1 of a cross between BALB/c (M+V) and DBA/8 mice. Eighty per cent of these mice produce spontaneous mammary tumors by the time they reach ten months of age. In spite of the fact that these mice are so prone to tumor development, amygdalin showed some interference

with the typical tumorgenic process of this strain. The agent has a decided effect against the formation of lung metastases and upon the appearance of new tumors. In some cases, inhibtion of established tumor growth was observed.

Dr. Daniel Martin, Department of Surgery Research at the Brooklyn-Queen Catholic Medical Center, has been employing this strain in examining the efficacy of various chemotherapeutic and immunotherapeutic protocols upon the post-surgical recurrence of malignancy. As Dr. Martin has already demonstrated, this strain lends itself perfectly to such an experiment and affords a close and valuable emulation of the clinical situation in human mammary cancer. As a possible extention of this sort of work, amygdalin might be used in this way to determine its effect upon recurrent disease.

Some preliminary data about Swiss Webster mice is shown in Table II. A total of five mice were used. As seen, three of these mice which had small mammary tumors and were treated as usual with amygdalin showed tumor regression and in two of these, tumors could no longer be detected. In mice with larger tumors, regression may be less easy to obtain but <u>inhibition</u> of tumor growth seems so far to be the rule in this strain. Dr. Sugiura has never observed complete regression of these tumors in all his cosmic experience with other chemotherapeutic agents. Also as seen in Table II, addition of B-glucosidase does not afford low doses of amygdalin any anti tumor effects. The results clearly state

that amygdalin must be further studied. The improvement of health and appearance of the treated animals in comparison to controls is always a common observation.

Dr. Sugiura is presently attempting to see if amygdalin will prevent the initial appearance of mammary adenocarcinoma in young CD_8F_1 mice.

Summary

Amygdalin in i.p. doses of 1000-2000 mg/kg/day causes significant inhibition of spontaneous mammary tumors in the highly inbred CD_8F_1 mice is significant inhibition of the formation of lung metastases and possibly prevents, to an uncertain degree, the formation of new tumors, regardless of the age of the mice. Greater inhibition of tumor growth was seen in smaller spontaneous tumors of this strain.

In Swiss Webster albino females with both large and small spontaneous mammary tumors, amygdalin caused regression in 4/5 animals studied and complete regression in 2/5. The complete regressions occurred only in small tumors on non-inbred mice.

All treated animals maintained better health and appearance than the controls.

Summary - Continued

Dr. Sugiura is presently involved in determining whether amygdalin will prevent the occurrence of spontaneous tumors in 60 CD_8F_1 mice. The results will be reported when available.

TABLE II

Animal(s)	Tumor	Dose of Amygdalin	+B-glucosidase	Inhibition	Regression	Lung Metastases
5 CD_8F_1	Spontaneous Mammary	50	yes	none	none	——
1 Swiss Webster	Spontaneous Mammary (1.6 x 1.3 cm)	37.5 (40 days)	yes	none	none	none
1 AKR	Spontaneous Osteogenic Sarcoma (1.6 x 1.7 cm)	2000 (10 days)	no	yes	slightly	——
2 Swiss Webster	Large Spontaneous Mammary (1.5 x 1.5 cm)	1000 (21 days)	no	1/2	1/2	none
3 Swiss Webster	Small Spontaneous Mammary (0.7 x 0.7 cm)	1000 (20 days)	no	3/3	2/3 (tumors undetectable)	——

Addenda (to Sugiura report) June 13, 1973

Table III is an updated extension of the data of Table II. The additional information pertains to experiments, some yet in progress, in which five Swiss mice were (are) being injected with 2000 mg/kg/day i.p. over extended periods. The data further points to the fact that tumors larger than about 1.0 x 1.0 cm are less likely to be inhibited by amygdalin ones about this size or smaller.

Dr. Sugiura reiterated that these animals are difficult or impossible to cure in all of his experience. This is why the two animals which have showed complete regression are so significant. So far, these two mice remain tumor free, in spite of discontinuance of treatment.

Unfortunately, no data are available about the comparative members of actual lung metastases because their size and the size of the average mouse lung makes this difficult. Apparently, gross examination reveals that the number and size of lung metastases/animal, in those animals which displayed them, were no different between the two groups.

No gross difference in the primary tumors could be observed between the treated and control groups in the CD_8F_1 experiments. Histology was not performed because no pathologist was available and at any rate, it was felt by Dr. Sugiura that the size of the tumors in some cases would have made making their sections precarious.

As yet, no tumors have appeared in the control or laetrile-treated batch of 60 CD_8F_1 female mice born in December, 1972. Spontaneous Tumors are expected to appear in these animals this month.

This report consists of observations on the effects of prolonged treatment with laetrile (SK1691) on the growth of spontaneous mammary tumors (adenocarcinomas) in Swiss albino mice. These animals received 1000 or 2000 mg/kg/day of laetrile daily intraperitoneally.

The results obtained are summarized in Table 3. It shows that repeated intraperitoneal injections of laetrile had no effect on large tumors (more than 1.5 cm diameter). However, it caused a complete regression of small tumors (less than 1.0 cm diameter). One of the six treated animals had lung metastases.

K. Sugiura
June 13, 1973

Table

Effect of Amygdalin on Spontaneous Mammary Tumors in Swiss

	Date Tested	Original tumor size (cm).	Dose mg/kg/day	Duration of injections (days)	Duration of Experiment days)
Control	4/3/73	0.9 x 1.6	CMC	35	49*
	4/3/73	0.9 x 1.1			
Control	6/19/73	0.8 x 0.8	Saline	49	49**
Control	6/19/73	1.3 x 1.3	Saline	49	49**
Control	6/19/73	1.6 x 1.4	Saline	49	49**,‡
	1/16/73	1.6 x 1.3	37.5 + 50 mg/kg β-glucosidase	36	40*
	2/19/73	1.6 x 1.6	2000	10	10*
	3/7/73	1.5 x 1.6	1000	18	19*
	3/7/73	1.5 x 1.5	1000	56	127**,‡
	3/13/73	0.7 x 0.6	1000	12	13*
	3/13/73	0.7 x 0.7	1000	34	35*,‡
	3/13/73	0.7 x 0.4	1000	56	122**
	4/18/73	1.5 x 1.3	2000	32	33*
	4/18/73	1.9 x 1.5	2000	34	42*
	5/31/73	0.8 x 0.7	2000	43	70**,‡
	5/31/73	1.0 x 0.7	2000	43	70**,‡
	5/31/73	1.6 x 2.1	2000	20	21*

* Death of animals
** Sacrificed
‡ Growth of tumor stopped for entire cour:
□ Absence of tumor at autopsy
△ Absence of tumor at 14th day

Albino Mice (Taconic Farms)

Tumors						
Growing	Stopped Growing	Regressing	Regressed	New Tumors	Lung Metastases	
X				0	+	*1
X						
X				0	-	
X				0	-	
	X			0	-	
X				0	-	
		X		0	-	*2
X				0	-	
	X			0	-	
			X□	0	-	
	X			0	-	*3
			X△	0	-	
X				0	-	
X				1	+	
	X			0	-	
	X			0	-	
X				0	-	

REMARKS

***1 Also metastases in pleural cavity**

***2 Fibrosarcoma, not a mammary tumor. Also had a nodule at mediastinum.**

***3 Tumor contained only pus.**

IV

COMMENTARY AND ANALYSIS

COMMENTS ON THE STUDY OF LAETRILE IN TUMOR BEARING MICE BY DR. KANEMATSU SUGIURA OF MEMORIAL SLOAN-KETTERING CANCER CENTER OF NEW YORK CITY

As described in his written conclusions dated 3 August 1973, 1 March 1974, 5 March 1974, 31 May 1974, 30 September 1974, and 8 February 1975

Ernst T. Krebs, Jr.

The original above conclusions, together with the full supporting raw experimental data, are hereto attached. Dr. Sugiura has in each study reported only his direct gross and microscopic observations in terms of the effect on the primary tumor, the effect on pulmonary metastases, the effect on general growth and health, and the effect on life extension of Laetrile (amygdalin, nitriloside, vitamin B-17) on tumor bearing mice as compared to control groups.

In each of the above six series of studies of the effect of Laetrile on tumor bearing animals a clear antineoplastic effect was reported by Sugiura as shown in the appended data.

It is important to emphasize that we are not dealing with a drug, but with a non-tox water-soluble accessory food factor found in over 1,200 plants, many of which are edible. We are dealing with a normal component of numerous *whole* foods. For example, the edible seeds of all common fruits contain roughly about 2 per cent of this non-toxic water-soluble accessory food factor, which some have conveniently termed a B vitamin, the seventeenth in order of elucidation.

Since Laetrile is non-toxic or at least no more toxic than such basic foods as dextrose, most of the criteria or parameters of putative antiblastic effects utilized for the study of the almost universally highly toxic chemicals studied in animal tumor systems are completely inappropriate in the context of this study.

For example, all other toxic chemicals studied for possible antineoplastic activity are in no way specifically antineoplastic or cytotoxic but act indiscriminately upon *any* rapidly proliferating cells. Such are the epithelial cells of the digestive tract, the respiratory tract, hair follicles, hemopoietic and myelopoietic and lymphopietic tissues, *and all other normal* tissues of the host. Because the neoplastic process is often associated with the rapid proliferation of highly undifferentiated somatic or hostal cells (which comprise the bulk of most cancers) as well as with the evocative definitively neoplastic elements, the non-selective cytotoxins or putative antineoplastic poisons will often account for a greater destruction of such rapidly proliferating cells in the neoplastic lesion than in most, but not all, other tissues of the body.

For example, any chemical or substance that will depress the white blood cell count (as well as the RBC) in a *normal* subject to the point ultimately of a fatal leukopoenia will do the same, of course, in the leukemic subject. This process does not involve the *selective* destruction of neoplastic cells but the indiscriminate destruction of all rapidly proliferating cells in tissues marked by—as a rule—a high concentration of mitotic figures.

The same mechanism is clearly operable in solid tumors, but instead of being reflected in a decrement of WBC and RBC and the like primarily it is reflected in the depression of the hyperplasia of a solid tumor. For this reason, virtually all toxic chemicals used against solid tumors ultimately dangerously depress the production of white and red blood cells in the treated subject and thus lead, respectively, to the leukopoenia and anemia that are the classical and constant "side reactions" of such chemicals.

It is clear, then, that all such systemically toxic chemicals utilized for putative antineoplastic effects will not infrequently substantially decrease the palpable size of a solid tumor. This is almost always accomplished at the cost of seriously (and often irreversibly) depressing the immunological defenses of the host. Without exception, these toxic chemicals (foreign to biological experience) are immunosuppressive in much the same way that radiation is immunosuppressive. As a result of such immunosuppression, the rate of metastases of the primary tumor is often exacebrated even while its palpable size declines. This is borne out clinically in the morbidity and mortality figures.

* * *

In Sigiura's studies NO systemic toxicity for Laetrile is observed. To the contrary, Sugiura writes in his 1 March 1974 report: "The general health and appearance of the Amygdalin-treated animals with tumors was much better than that of the controls." This is despite the fact that in the same study Sugiura writes Laetrile "caused an inhibition in about 50 per cent of the tumors."

The seeming paradox between the inhibition of tumor growth and the superiority in general health and appearance of tumor-bearing animals as even contrasted to normal controls, means obviously that Laetrile is exerting a systemically apparent metabolic and highly physiological effect. (There are those who attribute an "highly physiological effect" arising from a non-toxic water-soluble accessory food factor—commonly found in food—to be the effect of a vitamin. Such observers have invited any possibly more precise description of such a definitely non-drug or non-harmacological substance.)

It is clear that since Laetrile is *per se* not only free from toxicity but even contributory to the enhancement in general appearance and health, according to Sugiura, of tumor bearing mice as compared to controls, Laetrile then can not possibly be (1) destroying even the most rapidly proliferating somatic or hostal cells or tissues (e.g., intestinal, respiratory, urinary epithelia, etc.); (2) inhibiting the growth or destroying *any* of the somatic scaffolding of solid tumors—blood vessels, connective tissue, even the most rapidly proliferating somatic parenchymal elements; (3) producing an immunosuppressive effect that fosters extensive metastases to the lungs and other tissues; and/or in any other way acting to exert anything other than a physiological effect.

Because Laetrile does not poison or destroy ANY rapidly proliferating somatic or hostal cells or depress the richest concentration of mitotic figures in ANY normal tissue, Laetrile will not—different from the very poisonous general cytotoxins futilely used as so-called antineoplastics—decrease the palpable size of *organized tumors*. Their extensive connective tissue scaffolding, their vascularization, their histologically identifiable somatic components—all will remain. Often the primary tumefaction will decrease in palpable size little or none. Certainly many of the systemically poisonous antineoplastic chemicals WILL decrease the size of the primary tumefaction by destroying almost all of the rapidly proliferating hostal or somatic tissue comprising such a tumefaction.

On the other hand, Laetrile should predictably retard the development of new tumors because of their inception there is little or no somatic or hostal investiture and almost pure neoplastic elements—the *selective* target for Laetrile. Sugiura in his 1 March 1974 report writes: "Amygdalin had a strong inhibitory effect on the development of *new tumors* and on lung metastases (11% against 89%) in mice." (Emphasis added.) This study involved spontaneous mammary tumors in CD_8FI mice.

Another parameter unique to Laetrile calls for emphasis. While Laetrile is reported as inhibiting strongly the development of new tumors in tumor bearing mice, and in the most massive doses *never* showing in normal mice anything in this regard but a powerful prophylactic or tumor-inhibiting effect, all of the standard or systemically poisonous "antineoplastic" compounds, like radiation itself, fail not only to prevent tumors but almost without exception are powerfully cancer-inducing in sufficient doses. All are carcinogens.

* * *

Since it is only malignant tumors that generally metastasize and since it is the malignant components of such tumors—the definitively malignant cells rather than the benigh somatic or hostal blood vessels, connective tissue, and normal glandular tissue—that show the greatest propensity to metastasizing, secondary growths are biologically at their inception more highly concentrated in their neoplastic component than the primary tumor from which they sprang.

It is predictable, then, that Laetrile would produce a 78 per cent reduction in lung metastases than is found in the untreated control *even though producing an inhibition in growth in about 50 per cent of the primary tumors.* This is what Sugiura reported in the CD_8FI mice bearing spontaneous tumors.

Though Sugiura has properly eschewed all theoretical or interpretive comments, in almost every series he has reported quantitatively the depression in lung metastases even in individual animals showing no palpable decrement in the primary tumor.

We interpose the following interpretation from our theoretical context of his objectively reported observation: Laetrile prevented lung metastases in 78 per cent of the CD_8FI mice with primary mammary cancer not primarily through destroying these metastases as they reached the lungs but rather through so ablating the definitively neoplastic elements from the primary tumors as to deprive them of the neoplastic "seeds" for metastases. The reason why such inhibition of lung metastases was noted in 78 per cent of the tumor-bearing animals receiving Laetrile rather than in 100 per cent of such animals is that probably in the 22 per cent that sustained identifiable lung metastases the secondary growth had already implanted and received its vascularization and somatic investiture *prior* to the institution of Laetrile therapy. Be it noted that 100 per cent of the tumor bearing controls showed lung metastases as compared to the 78 per cent Laetrile treated animals that showed no metastases.

Sugiura's observations on the inhibitory effect of Laetrile on the development of lung metastases from primary mammary growths in mice are totally predictable: not only from the theoretical context in which Laetrile has been widely studied (the unitarian or trophoblastic thesis of cancer); but directly from clinical observations of human mammary cancer treated by numerous clinicians with Laetrile for well over a decade in 15 or more countries. Most of these patients show little or no depression in the size of the well organized primary mammary tumor

but like the 50 per cent of Sugiura's CD_8FI mice who, while showing no reduction in the primary tumor, showed a 78 cer cent lower incidence of lung and/or other metastases, these human patients carefully maintained under Laetrile showed no instance (known to the observers) of subsequent pulmonary metastases. In many of these patients total resolution of palpable axillary and similarly regional tumefactions have been noted. Also like Sugiura's observation that "general health and appearance of the amygdalin-treated animals with tumors was *much better than that of the controls*" (emphasis added) the breast patients adequately treated with Laetrile uniformly showed or show a degree of health and appearance vastly greater than is usually observed or predictable for a patient carrying mammary tumors of the palpable extent and for the time observed in such patients.

Indeed, the vocal insistence of such patients—as well as of their friends and family—that Laetrile accounts, despite their palpable tumor, for their survival in apparently good or excellent health, otherwise, is undoubtedly a major factor in the now almost universal clamor of cancer patients for Laetrile. On the other hand, the persistence of the palpably and essentially unchanged mammary tumefaction in such patients—as reflected by the "objective" evidence of caliper and tape—account for a few sincere and otherwise competent physicians who ovserve such unresolved tumefaction of three years of more standing to damn Laetrile out of hand as quackery. The more thoughtful are commencing seriously to ponder the reason why such tumor-bearing patients are so assertive, if not often evangelistic, as to how "wonderful" they feel and function under Laetrile despite the fact that they've carried evidence of the original tumefaction for six years or more.

Since each such patient is an individual, her case represents academically—to some—"an uncontrolled anecdotal observation."

Sugiura's studies on spontaneous mammary tumors in CD_8FI mice treated with Laetrile have been extended to studies on spontaneous mammary tumors in albino mice treated with Laetrile. He reports (8 February 1975) "Amygdalin had a strong inhibitory effect on the development of lung metastases in mice—77 per cent inhibition against 7 per cent inhibition in controls." These observations parallel those in both the CD_8FI mice and in human cancer. The parallel among all three is further exemplified in Sugiura's observation that "The general health and appearance of the amgdalin-treated animals were much better than that of the controls."

In view of the fact that Sugiura's first six reports on the surveillant anti-neoplastic action of Laetrile confirm themselves not only from one strain of mice to another but are also confirmed, or confirmatory of, at least five other independent studies on tumors systems in animals demonstrative of the clear antineoplastic action of non-toxic concentrations of Laetrile, it might seem that a restudy of the same tumor systems in which the variables of surgical resection, radiation and/or toxic chemotherapy are introduced would be most appropriate to impelling clinical considerations.

Would the Laetrile-treated mice survive longer and in better health and appearance if surgical resection of the primary growth were turned to prior, subsequent or during Laetrile treatment? Would the Laetrile untreated controls that were resected, radiated, or drugged show a morbidity and mortality pattern better than or inferior to that shown by (1) those treated solely with Laetrile, (2) those treated with Laetrile and resected, (3) those treated with Laetrile and radiated, (4) those treated with Laetrile and resected and radiated, (5)

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those treated with methotrexate, 5-fluoruracil without Laetrile but with or without resection and radiation, and (6) those left entirely untreated?

Since an important measure of the validity of a putative scientific discipline is the predictivity of the results of its application, and since at least some of the foregoing comments have the semblance of the *a posteriori* treatment of experimental data, let us now predict the outcome of the suggested expanded experiments:

(1) The Laetrile-treated mice will survive the longest and at the highest level of health and appearance.

(2) The completely untreated tumor-bearing mice will show the next or second best pattern of health, appearance and survival.

(3) The surgically resected mice also receiving Laetrile will show a little lower level of health and survival.

(4) The mice receiving radiation with surgery—with or without Laetrile—will show still poorer health, appearance and survival profiles.

(5) The mice receiving 5 FU and/or similar radiomimetic drugs—with or without Laetrile—will show the poorest morbidity and mortality pattern.

It is further suggested that the dose of radiation, 5-FU and/or other poisonous modalities that are established experimentally as carcinogenic in mice or rats be substituted for an identical ration of Laetrile in order to determine whether Laetrile in the concentrations that in the case of all non-surgical modalities produce cancer, great debilitation, and/or death will act similarly.

A priori: When Laetrile is given to normal mice in the same concentration as that which in the case of any standard "antineoplastics" will produce cancer, debility and/or death, it will be found that the administered Laetrile will produce—confirmatory of Sugiura's repeated observations—an enhancement in "the general health and appearance of the Laetrile-treated animals (that is) much better than the controls."

* * *

"Tumor cells of untreated controls are very active and have man mitotic figures," Sugiura observes. "On the other hand," Sugiura adds, "Tumor cells of amygdalin treated animals are not very active, more hemorrhagic and degenerated and contain less mitotic figures."

The so-called "tumor cells" of amygdalin treated animals "are not very active" because most of these cells comprise highly primitive reactive somatic cells that proliferate responsive to the neoplastic stimulus (i.e., the trophoblast component). Upon Laetrile treatment the definitively neoplastic elements are selectively inhibited and/or ablated. As a result the stimulus to the proliferation of contiguous cells is diminished as shown by the substantial decrement in mitotic figures seen in such cells *of* the tumor. The hemorrhagic state observed represents the architectonic discontinuity induced as a result of the destruction of definitively neoplastic elements in their reception of hostal vascularization. There is also induced a structural discontinuity between the neoplastic elements and the contiguous hostal cells that these elements through their desmosomes "hybridize."

Sugiura's objectively or non-interpretively reported description of the histology of the Laetrile-treated tumor bears a striking resemblance, if not a word-for-word identity, with similar histological reports made by pathologists of Laetrile-treated human neoplasms observed over a span of almost twenty years. The same observations have been made on spontaneous tumors in cats and dogs that have been treated by Laetrile. Clinicians as well as pathologists in both human and animal medicine have for the greater part interpreted the observed hemorrhagic reaction and decrement in mitotic figures as simple focal necrosis *not* evidentiary of the selective antineoplastic action of Laetrile.

Such workers have labored under the *a priori* misconception that a "real" or "proper" selectively antineoplastic effect should be exhibited in the simple disappearance of all traces of the "tumor cells" or, at least, in a clear or clean non-necrotic decrement of a portion of the gross tumor. They have inadvertently reinforced their erroneous criteria in this area by the observation that the systemic antineoplastics—highly toxic chemicals—actually do in many cases greatly reduce the number of mitotic figures in the gross lesion and very often substantially "shrink" the size of the lesion and, for a time, apparently decrease its growth rate.

These latter phenomena are observationally true because such general poisons certainly do reduce the number of mitotic figures, and hence the rate of hyperplastic expansion, just as they reduce the number of mitotic figures in the intestinal epithelium, the respiratory epithelium, in hemopoietic tissue, in hair follicles and the like in a way also usually unaccompanied by focal necrosis.

The contradiction or seeming paradox between the focal action of Laetrile on the *organized* neoplasm, on the one hand, and that of Laetrile (amygdalin or vitamin B-17) on the other, is that while Laetrile without often very substantially decreasing the total size of the primary tumor will reduce the incidence of lung metastases by 80 per cent or more; while primary tumefactions showing a substantial decrement in both palpable size and (the reduction) in the mitotic figures responsive to the use of 5-FU, all other poisonous chemicals and/or radiation show an *increase* in lung and other metastases.

This explains, of course, why experimental animals bearing spontaneous neoplasms, as well as cats and dogs, and, above all, human patients who recieve Laetrile or vitamin B-17 therapy even when the primary tumors do not appreciably decrease in palpable size, show in almost all cases an (1) increase in, as Sugiura observationally phrases it, "the general health and appearance" of well being, a dramatic absence of the statistically predictable incidence of lung and other metastases, and a remarkable decrease in morbidity in general as well as in mortality.

This similarly explains why, on the other hand, experimental animals and man receiving "effective" or "antineoplastic" doses of the standard systemic poisons, such as 5-FU, fail not only to show the increase in general health and well being observed in the Laetrile subjects but an alarming if not fatal *decrease* in general health and vitality, often marked by an exacerbation in lung and other metastases that often if not usually account for the death of the subjects from cancer—despite a sometimes reduction in palpable tumefaction of the primary tumor—sooner than they would have died if left untreated; and, certainly, very much sooner than they would have died if provided with Laetrile (vitamin B-17). This is so even were we to rely solely upon the general or systemic metabolic effect of Laetrile or vitamin B-17—and hypothetically to exclude from

the picture the real and specific antineoplastic activity of Laetrile exerted against the definitively neoplastic cells in the primary tumor. On this basis alone it is highly probable that Laetrile or vitamin B-17 will generally show a higher "therapeutic index" in terms of improved morbidity and mortality than may be found from any other directly antineoplastic measure, so-called. The mechanical appropriateness of surgery is, of course, excepted.

In Laetrile research we are forever mindful of the unrefuted findings advanced by a number of investigators over the past thirty years whose epidemiological studies on the cancer population appear to show that those cancer patients left entirely untreated by so-called standard modalities live a little longer and suffer substantially less, as a population, than treated patients. Professor Hardin Jones, University of California Department of Medical Physics, has been studying this contention for the past 23 years; as recently as 1 September 1975 he reiterated the statement: "For a typical type of cancer, people who refused treatment lived for an average of 12-1/2 years. Those who accepted surgery and other kinds of treatment lived on an average of only three years... Beyond a shadow of a doubt, radical surgery on cancer patients does more harm than good..." Then, for radiation, he added, "Most of the time it makes not the slightest difference whether the machine is turned on or not."

For the past 15 years we have sought in vain for the slightest statistical evidence in refutation of conclusions such as those of Hardin Jones. Their evidence seems overwhelming. Refutation appears non-existent. To those emotionally disturbed by such claims we implore that substantive evidence—not opinion—be advanced in their refutation.

Thus, Laetrile is appropriately studied against untreated controls, though concrete experimental investigation of the effect of other modalities, as explicitated in the five experiments suggested on page five, is sorely needed.

The ineffectiveness of standard modalities in cancer therapy, then, may be considered correlative to the total inappropriateness of the parameters arbitrarily assumed as a measure of antineoplastic effectiveness. How may criteria rationally be defined for phenomena not as yet actually observed or at least studied in any detail?

Any chemical or modality that is systemically poisonous must rationally be excluded from serious consideration as an effective antineoplastic. All experience to date sustains this conclusion. Were the antineoplastic currently used in cancer therapy considered as intended agents for the arrestment of mitosis and the dramatic decrease in mitotic figures in most of the prominent epithelial tissues of the body, 5-FU, methotreate, and the like would brilliantly quality. A mild depression in the proliferation of hostal cells with a *non-hemorrhagic* reduction in mitotic figures and a palpable decrement in tumor mass in benign as well as malignant tumefactions would be a predictable concomitant of the depression of proliferation of normal epithelial cells.

* * *

In passing, it will be noted that Sugiura found Laetrile to be non-toxic in cancer and control mice in doses that exceed by 70 times or more the doses of Laetrile parenterally administered to human cancer patients.

It will be noted that in his report of 5 March 1974 Sugiura observed that although very high doses of Laetrile (2000 mg/kg/day) failed to "destroy the spontaneous

(primary) mammary cancer" in mice, they "show a strong inhibitory effect on the development of lung metastases in mice—22% against 100%"—a retardation of metastases of 78 per cent. Sugiura then added, "The general health and appearance of the amygdalin-treated animals was much better than those of the controls."

Why were "the general health and appearance of the amygdalin-treated animals" so "much better than those of the controls"? Could it be that despite the fact that the palpable tumefaction of the primary tumor—what Laetrile therapists over the world have deprecatively come to describe as "the lumps and bumps"—failed to diminish that the neoplastic or metastasizable component of that composite was selectively ablated so that no definitively neoplastic cells were available for metastases from a tumefaction rendered biologically relatively benign? The alternative would seem almost mystical—that Laetrile destroyed only cancer cells as they metastasized but not in their primary site.

Obviously, the 22 per cent of metastases that occurred (as contrasted to 100 per cent in the controls) persisted in the lungs as organized secondary tumors that had received their stromal investiture and their vascularization. Are the latter a special but unknown variety or deviant subtype of the cells that in 78 per cent of the cases DID NOT metastasize to the lungs? Or were the cells in the 22 per cent of the subjects that showed organized metastases in the lungs simply those that (a) either reached the lungs earlier and had a longer period irreversibly to organize a tumefaction, (b) and/or the result of a *relatively* lower hostal resistance in the animals sustaining such lung metastases?

To some observers the "failure" of Laetrile (vitamin B-17) to inhibit the growth of the primary mammary tumor, despite a 78 per cent inhibition in metastases, was falsely construed as a failure of the Laetrile to act. In practical terms one might well ask: What kills human patients with primary mammary tumors? Is it the size of the *non-metastasizing* primary growth? Does this kill at all? Or is it the presence or absence of metastases? Indeed, even though all trace of the primary tumor be ablated, obviously metastases alone can kill—while it is, indeed, very rare that (given decent hygiene) a non-metastasizing primary mammary tumefaction kills a woman.

On such grounds, then, is it irrational for Laetrile clinicians to administer parenterally—as they do all over the world—doses of Laetrile in human mammary cancer that are less 1/70 the dose universally found totally non-toxic in mice of various strains that show a 78 per cent reduction in pulmonary metastases as a result of such administration?

* * *

That the organized primary mammary tumor should show, in many cases, no correlation between the biological malignancy of the lesion and its unchanging size (when we measure biological malignancy in terms of metastability) is not without parallel, if not without surprise, when we recall that the physiological malignancy (as measured by the metastization of its trophoblast component) of the mammalian placenta actually decreases in size in proportion to the growth of the placenta.

We recognize cancer, of course, as "trophoblast at the wrong time and/or place." It is unnecessary to belabor here the trophoblastic fact of cancer while from laboratories all over the world one to six different hormones UNIQUE to trophoblast are found now in virtually every time of malignant exhibition in a

concentration bearing a direct proportionality to the malignancy of the exhibition. Workers at the National Cancer Institute, for example, reported such hormones in over 70 per cent of all human mammary cancers studied.

But rationality imposes an intellectually inescapable impulsion to confront the reality of the trophoblast identity of the definitively malignant component in *any* neoplastic lesion. The fantasy that the neoplastic element is a product of spontaneous generation as an alternative to its being the most primitive cell in the mammalian life-cycle can no longer be tolerated in a rational context. No science can move forward with a major or catastrophic hiatus in its basic formal structure.

Recognizing that the cancer cell is "trophoblast at the wrong time and/or place"—a component normal to the animal life-cycle—and that all animals are disposed to one degree or another to *differentiate* such cancer (trophoblast at the wrong time and/or place) we can intellectually, if not emotionally, immediately come to terms with the fact that an accessory food factor less toxic than ordinary sugar can be specifically antineoplastic.

The specific surveillant antineoplasticity of vitamin B-17 or Laetrile as a totally non-toxic factor normal to the biological experience of the organism is *a priori* compellingly suggestive that the target for this surveillant antineoplastic dietary factor must LIKEWISE BE AN ELEMENT NORMAL TO THE BIOLOGICAL EXPERIENCE OF THE ORGANISM.

For concrete reasons well expliciated in the biochemistry of morphogenesis, the propensity of animals normally to differentiate what we call cancer is an indwelling attribute which normally is kept beyond pathological exhibition through the normally occurring presence of the surveillant antineoplastic vitamin B-17 or (medically) Laetrile that shears off neoplastic elements surveillantly while they are still in the incipiency Sugiura found for the neoplastic cells that failed to show lung metastases in 78 per cent of the animals under the surveillant antineoplastic activity of Laetrile or vitamin B-17.

In addition to the extrinsic dietary antineoplastic factor of vitamin B-17 (Laetrile) the *intrinsic* surveillant antineoplastic activity of the immunological resources of the organism mediated through, for example, the circulating T lymphocytes must be mentioned in passing; nor is the critical role of the totality of the pancreatic enzymes as well as the enzymes of raw plant and animal food in their "deshielding" effect against the electron-dense sialomucin pericellular layer of the neoplastic (trophoblastic) cell that gives to it its immunological privilege against lymphocyte attack to be overlooked.

It is to be hoped that future histological studies of Laetrile-treated tumor bearing animals will be take special note of the presence or absence of massive lymphocytic infiltration into the hemorrhagic area of the affected tumor. We predict that in those cases in which lung metastases are inhibited by B-17 the primary tumors will consistently show heavy lymphocytic infiltration in proportion to the degree of such inhibition.

It is further predicted that if the totality of crystalline pancreatic enzymes are added to the treatment regimen as experimentally established by Sugiura in the tumor mice described the incidence of inhibition of lung metastases may well rise from 78 per cent to 100 per cent—total inhibition.

We would hasten to add, however, the caveat that the described augmentation in antineoplastic effect will NOT predictably decrease the palpable tumefaction

of organized primary tumors beyond the action of Laetrile itself in doing so. To do so would be to intrude immediately into the area of gross toxicity produced by the destruction of primitive albeit somatic or hostal cellular elements. The physiologically self-limiting vitamin B-17—as well as the described enzymes—being totally congruent with biological experience could not so intrude.

Only the systemically poisonous so-called antineoplastics may be destroying all rapidly proliferating somatic cells to account for the pyrrhic reduction of the organized primary tumor mass—beyond the level fostered by B-17—at the cost of destroying hostal stem or embryonal repair cells throughout the organism and producing an immunosuppressive effect that invites death through metastases.

* * *

Prophylactic Effect. The non-toxic water-soluble accessory food factor, vitamin B-17 (Laetrile, amygdalin), was found to prevent the development of mammary tumors in 22% more of the treated mice than in the control mice (48% in treated mice and 70" in controls). "...Amygdalin had a strong inhibitory effect on the development of lung metastases in mice—75 per cent inhibition against 22 per cent in controls." In this 30 September 1974 report Sugiura further observes: "The general health and appearance of the amygdalin-treated animals were as good as that of the controls in spite of 16 months of injections."

"The body weights of control animals *without* tumors and that of amygdalin-treated animals *without* tumors all showed a gain in weight. The surveying animals are approximately 21 months old." (Emphasis added.)

It will be noted that the normal life span of these animals is about 28 months. For 21 months of these 28 months they received a *daily* injection of Laetrile amounting to 1,000 mg/kg/daily. This would be equivalent to administering a daily ration of 70,000 mg of Laetrile for 52.5 years to a 70 kg (150 pound) human subject with a life-span of 70 years. Setting the average liberal prophylactic dietary ingestion of vitamin B-17 (Laetrile) as 50 mg a day, we would have in this prophylactic dietary ration 1/1400 a day of the ration of B-17 that proved totally non-toxic or physiological when administered to these mice for three-quarters of their life span.

Such a dietary ration of vitamin B-17 (Laetrile) would be provided by *one* bitter almond seed a day; or 6 apricot, peach, plum or prune seeds a day *were we to exclude every other natural source of vitamin B-17 (amygdalin)*, such as mung beans, lima beans, bamboo shoots, millet, broad beans, raw sugar from sorghum cane, raw sugar from sugar cane (*Saccharum officinarum)*, raw sugar from sugar beets (*Beta vulgaris)*, and many other whole or unrefined plant or vegetable foods. IF we did not exclude all these other sources of vitamin B-17 (Laetrile) inadvertently from the human diet and the diet of our domesticated pets, all of these other nitrilosidic foods would supplement or obviate the reliance upon even a daily ration of *whole* fresh or dried fruits.

Under the conditions of the experiment, the first spontaneous occurrence of a mammary tumor in the amygdalin-treated mice was seen 79 days *after* the first occurrence of such a tumor in the untreated controls. In addition to delaying the occurrence of the first mammary tumor in the treated group, the total prophylactic effect of vitamin B-17 (Laetrile) was such as to account for *a reduction of 68.8 per cent of the total incidence* of spontaneous mammary tumors in those mice receiving vitamin B-17 prophylactically for two-thirds or more of their life spans as compared to those control mice that for the same period

received no vitamin B-17. Moreover, in those vitamin B-17-treated mice that did develop spontaneous mammary tumors (with an incidence of such 68.8 per cent lower than the unsupplemented controls) fewer than one-third of these animals developed lung metastases as compared to the unsupplemented controls. Since it is metastases that kill, rather than the primary tumor, in mammary cancer, we may, I submit, conclude that the amygdalin-treated mice showed a prophylactic reduction in potentially fatal mammary tumors in excess of 200 per cent over that of the controls.

It will be noted again that Sugiura reports that "The general health and appearance of the amygdalin-treated animals were as good as that of the controls in spite of 16 months of (intraperitoneal) injections" and in addition to this such administered Laetrile (vitamin B-17) had a surveillant prophylactic effect that accounted for a reduction of 68.8 per cent of the total incidence of cancer in the vitamin B-17 supplemented animals.

A material that is non-toxic, water-soluble, occurs in over 1,200 plants—a great many of which are edible—and accounts for an enhancement in general health and appearance in supplemented animals as compared to controls is obviously a non-toxic water-soluble accessory food factor. It is "accessory" because it is neither fat, protein, or carbohydrate or mineral and is non-calorigenic. Such a factor is formally recognized as almost identical to or identical to a vitamin. In order fully to qualify for the status of a vitamin the substance must be shown to be "necessary for the normal metabolic functioning of the body" (Dorland's Illustrated Medical Dictionary, 23rd ed, W. B. Saunders, 1957, Philadelphia). Dorland's definition is as follows:

> "vitamin (vi'tah-min) (L. vita life / amine). A general term for a number of unrelated organic substances that occur in many foods in small amounts and are necessary for the normal metabolic functioning of the body. They may be water-soluble, or fat-soluble."
>
> "v. B complex, a group of water-soluble substances including thiamine, riboflavin, nicotinic acid (niacin)...etc. etc."

On page 1534 Dorland lists vitamin B-15 (pangamic acid) as the most recent of vitamin denominated as a member of the B Complex as of 1957.

Admittedly, the action of Laetrile, reported by Sugiura and numerous other workers, in enhancing "the general health and appearance" of mice brings this non-toxic water-soluble accessory food factor within the non-specific metabolic effects that characterize members of the B Complex. The experimentally demonstrated specific antineoplastic action of this factor in reducing the total incidence of spontaneous cancer in mice by 68.8 per cent, by retarding lung metastases by 78 per cent, by producing complete tumor regression in a few subjects, and the like makes its formal denomination as a specific surveillant antineoplastic vitamin of the B Complex a tautology if not a superfluity. Since the numerations of proved members of the B Complex have been preempted at least to a level inclusive of vitamin B-15, this leaves the next available slot as 17, a slot which the antineoplastic vitamin B-17 occupies with such total precision, conclusiveness, and completeness as to leave such occupancy beyond rational challenge. (Political challenge is *not*, as a rule, "rational challenge").

In further evaluating Sugiura's findings on the surveillant antineoplastic action of this new vitamin (amygdalin or Laetrile), it is important to recognize

that (1) the intraperitoneal administration of a vitamin is a deviation from the normal biological experience of animals that evolved with the oral or dietary ingestion of the vitamin, and (2) the experimental tumor-bearing mice use are themselves an experimentally manipulated genetic deviation from such animals as they naturally occur. These mice are extremely homozygous; for all practical purposes they are the genetic counterparts of identical twins. They have been experimentally interbred for genes determinative of the *differentiation* "spontaneously" of mammary (ductal?) hyperplasia eventuating in tumefaction and then ultimately in neoplastic tumefaction occurring with the differentiation of trophoblast in the decidua so prepared.

The surveillant antineoplastic effect of vitamin B-17 (amygdalin, Laetrile) obviously can not alter the genotype; nor is there any evidence that such a vitamin can prevent the gene-determined differentiation and hyperplasis in the mammary glands that *precede* the literally neoplastic differentiation of trophoblast in the locus to make the affected tissue "cancer"—"trophoblast at the wrong time and/or place."

It appears probable that the surveillant antineoplastic action of vitamin B-17 is not fully exerted until the focus has reached the point of trophoblast induction. This question, however, remains for experimental resolution. It is established, for example, that rapidly proliferating stem or primitive or embryonal *somatic hostal or body cells* are associated with relatively high levels of beta glycosidase and extremely low or deficient levels of rhodanese (thiosulfate transulfurase). Just at what point the surveillant antineoplastic action of vitamin B-17 in morphogenesis is exerted is not completely known: Is it prior to the induction of trophoblast (prior to neoplastic differentiation), concomitant with such differentiation, or after such differentiation?

If it is prior to neoplastic differentiation the surveillant action of vitamin B-17 should go far to preclude even a precancerous lesion or "tumefaction." If it is concomitant with it, such morphological differentiation through the precancerous stage should be left largely unaffected by B-17, which then would not come into effect until cancer (trophoblast) had emerged. Shearing off such definitively neoplastic elements from the tumefaction, vitamin B-17 should then account for an impressive repression in, for example, lung metastases.

It would seem almost certain that the extrinsic surveillance of antineoplastic vitamin B-17, as well as the intrinsic antineoplastic surveillance of the immunological system medicated through T-lymphocytes and the like, could not inhibit, for example, the morphogenetic response of ductal mammary tissue serving as a target for an unremittingly heavy and discontinuous challenge of estorgen. "Tumefaction" would be predictable even in the face of a metabolic adequacy of antineoplastically surveillant vitamin B-17. The morphogenetic structure is extremely capacious and labyrinthine, but not overwhelmingly so. The details of the blueprints of this structure are known as well as accessible. Time does not permit our making the exploration here. Such mention is made to foreclose any distraction from the basic surveillant antineoplastic action of vitamin B-17 by the illusory mystifications of the morphogenetic phenomena and morphology that cloak carcinogenesis.

Sugiura's experimental observations on the surveillant antineoplastic or prophylactic action of vitamin B-17 (Laetrile) are fully corroborative of those by Reitnauer (Arch. Geschwulstforch. 42 (4) 137-137, 1974) as reported from the Manfred von Ardenne Research Institute of Dresden in a paper entitled "Prolongation of Life in Tumor-Bearing Mice by Bitter Almonds." In summary, Reitnauer

reported (trans): "In mice with Ehrlich ascites carcinoma, bitter almonds taken in *addition to standard feed in free food choice* caused a significant prolongation of survival time, which is associated with *inhibition of tumor growth* (emphasis, ours). The bitter almonds used carry about 6 per cent by weight of vitamin B-17 (amygdalin, l-mandelonitrile-beta-diglucoside)."

The bitter almonds were placed in a pile supplementary to a highly varied (and presumably adequate) ration that was present in the cages at all times. Voluntarily the mice chose—presumably from instinctual impulsion toward B-17—to eat a few bitter almonds supplementary to their standard rations. The vitamin B-17 thus provided through voluntary food choice accounted for tumor inhibition and a significant prolongation of survival time—despite the fact that the animals had been inoculated with cancer cells.

Such inoculation represents the only substantial artificial or experimental dimension in this experiment. It is strongly suggested that Sugiura's original studies be extended, with all factors constant, except that vitamin B-17 be supplied orally in (a) free food choice of bitter almonds and/or apricot seeds, (b) vitamin B-17 added to standard rations, and (c) bitter almonds and/or apricot seeds added as a ground powder to standard rations. Such a study would reduce the artificial or manipulative variables down to the extreme homozygosity of the mice used.

It is well established that almost all subhuman primates, primitive men, and practically all animals in the aboriginal state ingest not only generally highly nitrilosidic foods, but specifically crack the pits or stones of fruits to eat the seeds or kernels within, which average a concentration of about 2 per cent of vitamin B-17. This behavior has been reported for squirrels, chipmunks, bears, wolves, even the domesticated dog, horses, cows, pigs, sheep, etc. Animals in the feral state or not artifically fed show an almost total immunity to cancer.

Veterinarians have reported the total resolution of even metastatic cancer in cats and dogs through the administration of vitamin B-17, corroborative of Sugiura's observations. In several instances such recoveries have been associated with the ingestion of large quantities of ground apricot and/or peach seeds. In Honolulu a young internist told me how her father with metastatic prostatic cancer when unable to obtain Laetrile still refused surgery, radiation, and/or chemotherapy but turned to whole apricot seeds. For three months he ate an average of 75 such seeds a day. This amounts, roughly, to an ingestion of about 600 mg of vitamin B-17 a day. At the end of the fourth month he appeared to be a clinical "cure" and has remained in such complete remission to the present—over four years later. He still ingests about 12 apricot seeds a day prophylactically.

It is clear, of course, that these observations, unlike Sugiura's experimental findings, are "purely anecdotal" as some are wont to remind us.

Thus vitamin B-17-containing seeds have been shown in experimental mice to duplicate the antineoplastic reported by Sugiura for crystalline-pure vitamin B-17 (Laetrile) injected into tumor-bearing mice. These laboratory studies corroborate the observations on the clinically practicable quantities of vitamin B-17 shown through the antineoplastic action of ingested plant materials containing 2 per cent B-17. Such action has been reported following the administration of such plant materials to cats and dogs with clinically advanced (biopsied) neoplasms. At least one of these observations was published in the veterinary

literature reporting the clinical cure of a thyroid adenocarcinoma in a dog. Several cases of clinical recoveries from ciopsied cancer in cats have been reported following reliance solely upon ground apricot or peach seeds. These reports parallel those made on the injection of Laetrile into cats and dogs with subsequent clinical improvement or recovery. A number of cases have been reported on the successful clinical use of apricot seed meal in ameliorating human cancer. These are of necessity anecdotal, but they parallel what was experimentally determined in the Dresden studies in which both life-prolongation and decrease in tumor growth was found to an highly significant statistical level in cancer-bearing mice to which bitter almond seeds were made accessible for their voluntary ingestion.

The entire pattern is corroborative of Sugiura's repeated findings that vitamin B-17 (Laetrile) injected into CD_8FI mice bearing spontaneous tumors caused an inhibition in tumor growth and reduced the incidence of lung metastases by 78 per cent. Sugiura's findings further corroborate earlier studies at Scind Laboratories, University of San Francisco, where 200 rats treated with B-17 showed an 80 per cent increase in life span over the controls. At the Pasteur Institute in Paris, a human cancer strain was maintained in mice. Their life span was increased and tumor growth retarded up to 100 per cent.

Just as important in the independent studies corroborative of Sugiura's findings is his consistent ability to corroborate his own findings: to reproduce or duplicate them time after time over a span of two. His report of 1 March 1974 on the action of Laetrile in reducing lung metastases in CD_8FI mice by 78 per cent as compared to the controls duplicated in another study reported 5 March 1974. Then on 31 May 1974 he reports still another study in which Mexican and German Laetrile were compared with the finding of a reduction of lung metastases by 54 per cent for the Mexican Laetrile and 58 per cent for the German Laetrile over controls for the same strain of mice. On 30 September 1974, he reported in still another series, a reduction in lung metastases of 53 per cent. Then on 8 February 1975, he reported an inhibition of lung metastases of 70 per cent in spontaneous mammary cancer in mice, but these were a different strain of mice from the earlier strains: Swiss albino mice with spontaneous lung cancers.

The antineoplastic action of vitamin B-17 has thus been demonstrated and repeatedly corroborated not only for spontaneous cancer in various strains of mice, but for 256 carcinoma in rats, as well as human cancer implanted in mice at the Pasteur Institute in Paris.

It will be noted that again the 8 February 1975 report on Swiss Albino mice carries the ever-recurring observation that "The general health and appearance of the amygdalin-treated animals were much better than the controls." The metabolic action of vitamin B-17 is consistently and uniformly seen from strain to strain, species to species.

As early as 1953 the premature and extremely critical Report of the Cancer Advisory Council of the California Medical Association in reviewing medical records of 41 terminal cancer patients who at that time had been treated with what are recognized now as extremely inadequate doses, often receiving less Laetrile for the total treatment than is given in a single dose today, nevertheless did not fail to take note of the vitamin-like action of Laetrile in physiologically enhancing normal metabolic process. The Council reported:

> "The information thus recorded shows that no objective benefit was realized by the use of this agent in cancer. The clinical observations

> of several members of the Cancer Commission who reviewed the information collected, and in some cases had the opportunity of seeing the patients thus treated, indicated that *laetrile may exert a temporary, metabolic effect, probably on nitrogen metabolism.* Thus, *some of the patients have an increase in sense of well-being and appetite, and temporary gain in weight of the sort that is frequently observed with the use of any number of non-specific agents"* (emphasis added, p. 10 of the Report)

The described physiological or metabolic effects in 41 terminal cancer patients receiving in the entire course of their treatment less Laetrile than is now given in a single dose, nevertheless find parallel in all of Sugiura's reported animal studies: "The general health and appearance of the amygdalin-treated animals were *much better* than that of the controls." (emphasis added) (Kanematsu Sugiura, 8 February 1975)

It will be noted that even in terminal cancer patients (in whom all standard modalities had been exhausted and failed) a physiological or metabolic effect was observed, despite the fact that such patients received less than 1/5,000 the quantity of Laetrile (vitamin B-17) than Sugiura's mice bearing spontaneous mammary cancer.

In view of the fact that Laetrile is less toxic than ordinary dextrose, one might wonder as to the reason for the injunction of the Cancer Advisory Council against it, despite the fact that it had failed to save 41 terminal cancer patients in whom all other modalities had been tried and failed. The regulation states:

> "The use of (Laetrile) to the *exclusion* of conventional treatment *might* well be dangerous since treatments with acceptable, modern, curative methods (surgery and radiation) *would* thereby be delayed *potentially until such time as metastases had occurred and the cancer therefor might no longer be curable."* (emphasis added, Health and Safety Code, California...Public Health, Title 17, p. 188, Register 63, No. 17, 10-5-63)

It is thus apparent that the only material albeit extremely speculative and conditional contention of the Cancer Advisory Council against the use of Laetrile was that it *might*—through delaying the metastatic-arresting potentialities of surgery and/or radiation (?)—deprive the patient of the inhibition of metastases to the extent that such metastases would leave the patient "no longer curable."

A major thrust of Sugiura's studies of Laetrile on spontaneous mammary cancer in various strains of mice—as well as numerous similar studies—is that of establishing that Laetrile does NOT leave the cancer subject open to future metastases; but, quite to the contrary, prevents lung-metastases in as high as 75 per cent of the animals receiving Laetrile as compared to the controls. This metastases-prevention effect was observed in each of Sugiura's five or more studies. Of course, there is nothing to suggest that Laetrile therapists have ever eschewed the *sometimes* life-saving mechanical resources of surgery in conjunction with the "metabolic management" of the disease. Neither vitamin B-17 nor any other vitamin is contraindicated in animal or human cancer. In the utilization of the mechanical resources of surgery in cancer adequate "metabolic management," optimum nutritional management, is very important.

FALLACY OF THE INDEX OF TUMEFACTION

Throughout the study of Laetrile in numerous strains of cancer-bearing rats and mice, in cats and dogs, and in man the *bete noir* that abides is the fallacy of the index of tumefaction. This is the basis for sincere disagreements in the interpretation of *both* animal and human studies on Laetrile, and is so important that it justifies repetitive emphasis here.

A palpably large and organized cancerous tumor is the object often of total surgical excision—"we believe we got it all." The same tumor is the target often for the sophisticated cautery of radiation and/or the radiomimetic drugs, toxic chemotherapy—"we've substantially reduced the *size* of the growth." In the case of superficial growths the object of such cautery is to "burn it all out."

Both medical men and the laity look upon a tumor diagnosed by biopsy as a malignant tumor in its entirety. This perspective is reinforced by the fact that practically nothing in science or medicine has heretofore existed that was not directed toward the total surgical excision, the total burning out (cauterization of radiation) and/or the total poisoning of the tumor. The fewest vagrant cells eluding such gross efforts have been looked upon frequently, and justifiably so, as dangerous seeds of recidivation. The ideal and total therapeutic thrust is "to get it all."

"Getting it all" by cutting it out and, later, also radiating or burning it out were the sole practical objective and intellectual impulsion of all therapy in cancer from the time of Hippocrates to World War II. Then it was observed that certain extremely toxic chemicals are sometimes capable of grossly poisoning out a total tumefaction. These chemicals are described as mimicking the "burning out" action of radiation. They are called, therefore, *radiomimetic*. Over 400,000 such chemicals have been "screened" for anti-cancer effect in which the major if not the sole criterion is that of the index of tumefaction.

A few of the chemicals so screened have come into limited clinical use. They are systemically so poisonous that before destroying the gross palpable malignant tumor they often kill the host or patient. In any case, they make him quite ill.

Pathologists and laboratory workers in oncology during the past 30 or more years commenced to classify malignant tumors according to arbitrary grades. One such classification is that of Broders, which classifies cancer growths into 4 grades. The first grade contains very few neoplastic cells—perhaps 5 per cent; the second grade contains possibly 10 per cent definitively neoplastic cells; the third grade may contain possibly 20 per cent definitively neoplastic cells; and the fourth grade may contain 50 per cent or more actual cancer cells. The microscopist does *not* identify the "cancer cell" *per se*, but rather, measures the extent of its concentration or devastation in proportion to the degree to which the normal histology of the tissue is distorted or deformed by the presence of neoplastic cells. In the case of grade 4 cancers the histology of the tissue in which origin occurred is often so distorted that the deformation sometimes makes microscopic identification in terms of the primary site of origin impossible.

Let it be emphasized in passing that the described tumor classification is far, far from being infallible—at least for the purposes of surgery, radiation and/or toxic chemotherapy. The objective is still to "get it all." It is of no immediately practical consequence that in "getting it all" in the case of a clear

grade 1 cancer, the surgeon, radiologist and/or chemotherapist is getting, perhaps, 5 per cent definitively neoplastic cells and 95 per cent hostal or somatic cells, *normal* cells (albeit hyperplastic) comprising vascular tissue, connective tissue, glandular tissue, etc.

It is true that "getting all" of a grade one tumor betokens a far better prognosis for the patient than the putative "getting it all" in the case of a grade 4 cancer. This is not only because the grade one growth contains so few neoplastic cells and that the grade four growth contains so many, but because the grade one growth contains so few because the total (immunological) resistance of the host has prevented a higher concentration of cancer cells while the deficiency in hostal resistance has permitted an extremely high concentration of cancer cells in the case of the grade 4 growth.

These are all very real, if not commonplace facts; but they have been almost totally academic against the clinical thrust of "getting it all."

The advent of Laetrile (vitamin B-17) of necessity occurred in the described clinical milieu of "getting it all."

Laetrile was early observed as being no more toxic than dextrose. This brought down upon it the same suspicion that retarded the clinical advent of the antibiotics by 30 years or more when practical men declaimed that the universe was not so built that one could destroy germs in a living body without destroying or harming body cells. Think of carbolic acid, iodine, mercurial antiseptics, iodoform and the like; all good germ killers but very toxic and caustic.

After persisting clinical reports on the allegedly remarkable utility of Laetrile in human cancer from scattered physicians over the world, as well as from their vocally enthusiastic patients as well as friends and family, as well as scattered reports on its successes in pets, a few laboratory studies on cancer bearing animals were initiated by those highly sceptical of Laetrile. These investigators brought to their studies the major if not exclusive criterion of activity or usefulness the index of tumefaction. Will Laetrile cause the palpable "lump or bump" to disappear, or at least to be appreciably reduced in size?

With Laetrile in cancer bearing animals can we get rid of it all? The objective experimental findings are that with Laetrile (vitamin B-17) it is not possible to "get rid of it all" in terms of magically removing the palpable tumor or "the lump or bump." Sometimes such tumors fatuously studied under Laetrile were about 25 per cent as large as the host, the autosite, the rat or mouse itself. The larger the malignant tumor, the lower the concentration of cancer cells, as a rule.

The described routine but crude studies of tumor bearing animals treated by Laetrile resulted in the observation of "no objective effect" in terms of reducing the size or eliminating the tumor. If all the definitively neoplastic cells in most such tumors were *selectively* ablated this would account often for a decrement of less than 5 per cent in the size of the tumor—provided hostal fibroblastic repair did not more than compensate for such ablation.

Occasionally an extremely malignant tumor in man or in a domestic pet would completely disappear, preceded by liquefaction of the lesion. The hemorrhagic necrosis and decrement in mitotic figures that Sugiura reports in his mice studies would erratically—in distributive terms—sometimes occur so extensively

as to account for the sterile necrosis and liquefaction of a lesion followed by disappearance of the palpable tumefaction. This would then become the occasion for enthusiasm among Laetrile therapists and their patients, but subsequent patients would then show little or no "OBJECTIVE EVIDENCE," so-called, of improvement. The size of the primary tumor would remain essentially unchanged. The patient, as a rule, would insist to his doctor how very well he felt, how his energy, appetite, strength and weight had improved. The doctor would dismiss all this to the patient, or at least in his own mind, as subjective.

It is true that such patients, as a whole, insisted on the continuance of their Laetrile because it made them "feel so good." It is also true that very few, if any, of these patients developed, with the passing of time, the expected metastases. But these cases, after all, were not "run with controls." The case reports were anecdotal. Some patients without Laetrile also failed to develop metastases. Despite survival in otherwise good health for five, eight, ten or more years, the objective *lump* in a breast, for example, might remain. The patient was by then convinced that Laetrile was "doing wonders" for her. Her physician was tolerant and/or beguiled. And any surgeon or radiologist who might see the patient, despite her declamation for Laetrile and of excellent health, would sincerely insist—"It must come off" or "You must have radiation" or "Let us radiate it before and after surgery." These good clinicians would examine such patients and scream "quackery" in deprecation of Laetrile (vitamin B-17). These are the men who are captives of the "fallacy of the index of tumefaction."

Since it is, fortunately, only the definitively malignant cells that are destroyed and since these are the cells accounting for the metastability of a cancerous tumor—it is not connective tissue, blood vessels, normal parenchyma that are—then it is predictable that the appropriate criterion for measuring the antineoplastic activity of vitamin B-17 or Laetrile is the extent to which it retards or prevents metastases. Within this context Sugiura's observation that Laetrile prevented lung metastases in 70 per cent or more of the animals studied is highly predictable. It was a matter of total certainty and predictability that Laetrile would, as a rule, not destroy the *non-metastasizable* components comprising the vast bulk of the primary tumor. The crude index of tumefaction is totally inappropriate. Were Laetrile to destroy the normal or somatic connective tissue, blood vessels, and other normal cells in the primary tumor, Laetrile would of necessity have to be extremely poisonous to the animal as a whole—as are all the so-called antineoplastics.

Not the least important aspect of Sugiura's studies is that he came to them without any of the described facts, which would have served as preconceptions. He measured meticulously his results, and reported them objectively. Tumors are—if malignant—supposed to shrink and even disappear when "challenged" with effective (and of necessity) highly toxic antineoplastics. And if they don't shrink or disappear, they will metastasize. But the tumors he studied did not in their primary sites either shrink impressively or disappear. On the other hand, they did not metastasize. To the contrary, somehow their malignant or metastasizing components were destroyed or disappeared to the extent that the incidence of such metastases in his animals was reduced consistently by almost 70 per cent.

Moreover, effective antineoplastics are supposed to depress the vitality of the animal or the patient in the process of destroying the tumor. But Laetrile did NOT depress the vitality of the animals. Sugiura consistently observed that

"the general health and appearance of the amygdalin-treated animals were *much better* than that of the untreated controls." But how could the health of these animals and their appearance be "much better" when so little change occurred in their primary tumors? This does not happen with any of the known antineoplastics. Maybe if one of them should poison out a tumor—"get rid of it"—the animal might be better in "general health and appearance," if the poisonous antineoplastic had not killed him first.

There is a story of Galileo, apocryphal perhaps, that tells of a possibly playful episode in his classical studies that were running at the Tower of Pisa. Galileo instructed, so the story goes, one of his most dogmatic scientific colleagues to repeat a demonstration on the acceleration of falling bodies. This scientist was highly orthodox, a meticulous Aristotelian. Galileo gave him a weighed quantity of lead together with a comparatively small piece of cork. He instructed that the two objects be released at the same time. After many trials, carefully dropping both from the leaning tower, this experimentalist stormed into Galileo's study exclaiming: "There's something wrong with this rotten cork, or maybe the lead is no good, or maybe both are no good. The lead and the cork touched the ground at the same time, and we KNOW that this can not happen. Everyone knows it is impossible. It's common sense. Aristotle did not have to tell us—everyone knows that lighter bodies fall more slowly than heavy ones."

The false criterion of the index of tumefaction, as a measure of antineoplastic activity, is not even limited to the apparently pure induction surrounding Galileo's experiment. The fallacy of the index of tumefaction as a measure of the means of preventing and/or resolving clinically malignant cancer is clearly open to deductive as well as inductive proof. Since as much as 90 per cent of the bulk of a primary tumor comprises normal or somatic cells—body cells—anything that will destroy such normal body or somatic cells will destroy normal or somatic cells. Such destruction is inconsistent with health or survival itself. An agent must be poisonous in proportion to the extent to which it destroys normal or body cells; hence, anything that will totally destroy all primary tumors will kill the host.

An agent that is truly selective against an invading microorganism is relatively non-toxic to the host. It kills bacteria without poisoning or killing host cells. An agent that is truly antineoplastic in that it selectively kills ONLY neoplastic cells is totally non-toxic to the host. The moment it commences to depress the function of somatic or body cells it becomes toxic and in proportion to the extent it produces such depression its toxicity increases so that if it should totally depress all the cells of the tumor—destroy the primary tumor—it will kill the host before this is accomplished.

Within the real universe of cancer, those who question the activity of non-toxic Laetrile (vitamin B-17) on the basis that it does not "get it all," destroy the total tumor, are one with those who for years after Galileo still insisted that a bit of cork MUST fall more slowly than a pound of lead. Incidentally, this vulgar fallacy still persists among countless men. It all seems such impellingly good "common sense." Similarly the obsessive compulsion to "get it all" endures among laymen and all too many scientists in the matter of the proper, physiological or scientific management of cancer. The ability of a substance to ablate in its totality a malignant tumor is no more a criterion for the utility of such a substance in the prevention or therapy of cancer than the thrust generated by a propellor driven machine is a measure of its utility in the exploration of space.

We enthusiastically accord Dr. Sugiura's Laetrile studies on CD_8FI mice and Swiss Albino Mice bearing spontaneous mammary tumors the grade of A. Looking at the same data are respectable and competent scientists who might assign the findings the grade of F. Much in the same way there was once known schoolmaster who would fail to flunk a student who contended that the acceleration of a piece of cork in falling is identical with that of a ton of lead falling the same distance. There was a world of science who would have graded the experiment on falling lead as compared to cork, reported by Galileo, as F—total failure.

If we've belabored the falsity of the index of tumefaction as a criterion for the measurement of true or physiological antineoplastic effect, it is largely because there is no difference or controversy on what Laetrile (vitamin B-17) is reported as doing in the experimental animals studied. The raw data are there for all to examine. If there be any difference or controversy, it can exist only in the interpretation of the significance of such data. Those who take the decrement in the palpable size of a primary tumor as the governing criterion may describe the studies as failing to show the antineoplastic activity of non-toxic Laetrile (vitamin B-17). Those who recognize as overwhelmingly important and decisive the criterion of the total inhibition of metastases from a primary tumefaction see in Sugiura's findings of a 70 per cent total inhibition of such metastases in Laetrile-treated mice (as compared to controls) an experiment that at present not only proves the antineoplastic action of Laetrile, but proves it with a total success rate of at least 70 per cent.

* * *

We've briefly reviewed the evidence of the antineoplastic activity of Laetrile (vitamin B-17) as seen in (1) at least four independent studies on the antineoplastic activity of the material against apontaneous cancer in at least three strains of mice and for transplanted cancer in at least one rat strain, (2) the action of B-17 against a strain of human cancer implanted in mice (Pasteur Institute), (3) the limited or anecdotal (though published) evidence for the action of B-17 against spontaneous cancer in dogs, (4) its action against cancer in cats, and (5) the "anecdotal" evidence, running into hundreds of cases at the hands of numerous physicians over the world, for its value in the palliation and prophylaxsis of human cancer. Numerous of the latter have been reported as returning from "near terminal states" to essentially a sign—and symptom-free state. Almost all such cases had been carefully biopsied, the tumors classified, prior to unsuccessful standard therapy. Some cases subsequently left not even a residual lesion from which a biopsy could be made, and some with persisting tumefaction showed in the microscopic examination of the "residual" masses no identifiable neoplasia.

In some of the human lesions, such as advanced oropharyngeal neoplasms, there exist in the medical and scientific literautre only one or two cases of substantiated "spontaneous remission"—and these had prior radiation. There have been, for example, four cases of advanced oropharyngeal cancer that under Laetrile have shown clinically apparent recoveries of now three and four years' duration.

Spontaneous remission as an explanation for the described phenomena is, to say the least, a statistical impossibility for all practical purposes. Recovery as the alleged result of the delayed reaction of radiation and/or toxic drugs that at the termination of such therapy left the patient near-terminal does not seem tenable because in at least two cases such prior modalities were withheld as inappropriate to the advanced condition at the time of physical and laboratory diagnosis.

Moreover, the simple ingestion of highly nitrilosdic seeds—such as apricot and bitter almond—accounted for life extension and inhibition in tumor growth in rats experimentally studied by the Dresden group; and there are several "anecdotal" reports of such effects in human, canine and feline cases.

* * *

These observations and laboratory studies predictably are met by incredulity on the part of those who ask: "How can a non-toxic water-soluble accessory food factor, a vitamin—vitamin B-17—possibly control and kill anything so formidable as 'the virus of cancer'?" In passing it may be noted, of course, that no virus has yet been identified as the cause of any human cancer; nor, for that matter, of feline or canine cancer.

But if a virus is not the cause of cancer, it can not be the larger organisms—the bacteria, moulds, protozoa or the like. If cancer is not "caused" by extrinsic infective or transmissible organisms, then this would mean that cancer is a local manifestation of a systemic chronic metabolic disease.

Do the laboratory and clinical and epidemiological facts surrounding spontaneous cancer in man and animals provoke such a suspicion?

How could a vitamin prevent, arrest or even sometimes cure a chronic metabolic disease? Not all chronic or metabolic diseases have yet been successfully prevented, substantially ameliorated and/or cured. But every one that has been prevented, substantially ameliorated and/or cured has found such solution—without exception—in non-toxic, water or fat soluble factors or nutrients normal to animal metabolism: normal to biological experience. Stated more categorically, if not dogmatically: no chronic or metabolic disease has ever been prevented and/or cured except by non-toxic accessory food factors normal to the diet. Per nicious anemia, pellagra, beri-beri, night blindness, rickets, scurvy, hypoprothrombinemia, kwashiorkor, polyneuritis—and a score of other erstwhile incurable and fatal diseases come to mind.

Each of these chronic or metabolic diseases found total prevention and/or cure in non-toxic factors normal to the diet or normal to the animal economy. The facts warrant the emphasis of repetition: no chronic or metabolic diseases that have ever been prevented and/or cured have not found such prevention or cure except through factors normal to the diet.

Let it be noted that in every instance the factor which prevents is the factor that cures.

In Sugiura's studies no speculations are made that the spontaneous mammary cancers in CD_8F_i mice or in the Swiss Albino Mice were caused by a virus or other infective agent. The unquestioned assumption is that these tumors represent a metabolic or chronic disease, not an infective disease. Of course, there is no known virus that produces ANY disease in all species of animals. Cancer so occurs.

Since cancer is a chronic or metabolic disease, it may not be surprising to find that a non-toxic vitamin has been shown to prevent, ameliorate, and *sometimes* clinically "cure" it.

But if we are brought to the conclusion that vitamin B-17 (Laetrile) is the *specific* antineoplastic vitamin it is not enough merely to demonstrate its action in preventing and/or ameliorating cancer in all species of animals studied. We

must establish that large animal and/or human populations deprived of this vitamin through dietary inadequacies in it show a high or pandemic incidence of cancer that is neither age-, sex-, racially- or otherwise-linked, EXCEPT FOR A SINGLE VARIABLE: THE FULMINATING OR TOTAL DEFICIENCY OF THE DIET OF SUCH GROUPS IN THE SPECIFIC ANTINEOPLASTIC VITAMIN B-17. If and when it is shown that a subject belonging to a group chronically deficient in vitamin B-17 (Laetrile) develops a neoplasm, it must further be shown that the administration of vitamin B-17 to such a subject substantially ameliorates the lesion as shown by increased life-expectancy, increase in general health, and *sometimes* even through the resolution of the total lesion or at least through the selective destruction of the neoplastic cells in the lesion as shown, as Sugiura has shown, in the ablation of metastatic or cancer cells from such a lesion.

It is already thoroughly and clearly established that those human population—which involve all of the Western World—that have a serious or total deficiency in dietary nitrilosides or vitamin B-17 (Laetrile) have what amounts to a pandemic incidence of cancer, the disease at the clinical level striking one in three or four of such a population. Moreover it is equally clearly defined that those human populations that have an abundance of dietary vitamin B-17 (nitriloside) show a total immunity to cancer—just as those populations that have an adequacy of ascorbic acid (vitamin C) show a total immunity to scurvy.

The population of Hunza is an example of a cancer-immune population. The average life-expectancy of the male in Hunza is about 82 years. In the course of intensive medical observation first by the British Government and then by the World Health Organization for a period of over 75 years not a single case of cancer was found in this population. This is a country known as the land where the apricot is king. This fruit is eaten *whole*, with *the* seed or kernel, for three months of the year in the fresh state. For the remainder of the year it is eaten in the dried state. When so eaten one apricot seed or kernel is eaten with the two halves of the dried apricot. These seeds average 400 mg or about three such seeds weigh a gram. They carry about 2 per cent of vitamin B-17. It is not uncommon for a Hunzakut to eat thirty or forty such seeds in a day. Such a quantity of seeds alone will provide about 50 mg of vitamin B-17 (nitriloside), less than some Western diets provide in a year.

But in addition to the nitrilosidic apricot seeds these people rely upon other highly nitrilosidic food plants. Flax, millet, vetch, and buckwheat are four "cereals" that go into the making of bread-stuffs in Hunza. The broad bean as well as Burma beans, mung beans, and numerous wild berries also enter into the Hunzakut diet. Each of these food substances is very rich in vitamin B-17.

Both the details of the Hunzakut diet as well as the total freedom of these people from cancer are extensively recorded in the literature. But, nevertheless, I made it a point to interview extensively the 23-year-old son of the Mir (king) of Hunza on these matters while he was taking graduate work in the United States. He fully corroborated our earlier data. From my conversations with him, I've conservatively estimated the family vitamin B-17 (Laetrile) in the diet of the Hunzas to be in excess of 55 mg a day.

The population of Hunza is largely vegetarian. Critics of our studies on the Hunzakuts quickly stipulated (1) the freedom of the population from cancer, (2) the demonstrably high concentration of nitrilosides in their diet, and (3) that the diet was chiefly a vegetarian one. But they forcibly pointed out that in another cancer-immune population—that of the aboriginal eskimos—the diet is

almost exclusively a meat diet. This population was carefully studied by the Harvard anthropologist Vilhjamur Stefansson and reported in his monograph: "Cancer: Disease of Civilization" (Hill & Wang, N.Y., 1960).

Stefansson's studies on the diet of the cancer-free eskimos seemed to be a conclusive refutation of the conclusion that the vegetarian vitamin B-17-rich diet of the Hunzakuts accounts for their freedom of cancer. But in exploring the diet of the cancer-free aboriginal eskimos we turned to the examination of the food sources of the animals on which these people fed. We found, for example, that the major fodder grass of their caribou is arrow grass (*Triglochim maritima).* This is one of the richest sources of vitamin B-17 on this planet. One kilogram (2.2 pounds) by dry weight of this grass carries in excess of 100,000 mg of vitamin B-17! In the arctic the consumption of grass is especially high by these herbivores. The eskimos obtain not only the absorbed B-17 and its metabolites when they eat such meat but they also eat the rumenal contents of the animal comprising the masticated arrow grass. We can't follow at this time the full nitrilosidic-rich food chain among the aboriginal eskimo. But their food is as rich in vitamin B-17 as is the food of the Hunzakuts, despite the fact that their diet is almost exclusively a meat diet while the latter is almost exclusively vegetarian.

It's of passing interest, perhaps, that early nutritionists were as puzzled as much as to the dietary source of vitamin C (ascorbic acid) among the aboriginal eskimos as some later students were as to the dietary source of their vitamin B-17 (nitriloside).

It might be argued, however, that *both* the Hunzakut as well as the aboriginal eskimos profited not from the high concentration of vitamin B-17 (Laetrile), but rather from the fact that they live where the air and water are very clean in areas devoid of industrial pollutants. Thus, the absence of carcinogens rather than the presence of the surveillant antineoplastic vitamin B-17 might be said to account for their total freedom from cancer.

This would seem quite plausible until we study what occurred when the medical missions of the Dutch Reformed Church, and the like, changed their policy toward eskimos working in such facilities by allowing them to choose to take their meals at these settlements. In some cases a mother would opt for such an arrangement while a daughter and/or father would return at nightfall to eat the standard aboriginal fare. Within four years there was almost a pandemic outbreak of cancer among those eskimos who opted for eating the refined Westernized foods supplied by the mission facilities. In no case did a worker who continued eating the native fare develop cancer, though he/or she might have been working side-by-side with a male or female who lives in the same aboriginal quarter but who opted for the mission diet. In one facility there were a cluster of four cases of cervical cancer among women who opted for the mission diet while all other women remained typically immune.

The ONLY variable that could be detected in the above pattern is that of diet. The variable in diet is not that between a vegetarian diet, on the one hand, and a meat and vegetable diet, on the other, because the Hunzakut is immune from cancer on a virtually vegetarian diet and the aboriginal eskimo is equally immune on a virtually carnivorous diet.

The single variable is the *absence* of vitamin B-17 (Laetrile) in the Westernized diet supplied at the mission compounds, on the one hand, and the abundance of vitamin B-17 in the food eaten by the Hunzakut and the aboriginal eskimo.

No one has suggested as operative a virus that discriminates between eskimos that eat their native food and those that eat Westernized food so far as a possible viral infliction of cancer is concerned.

* * *

But the above populations are not unique. There is the entire population of domesticated cats and dogs. Their incidence of cancer, according to the American Veterinary Association, roughly parallels the incidence of cancer among their owners—much in the same way that the incidence of black tongue among the dogs of pellagrins in the South paralleled the incidence of pellagra in their masters.

Then there are the Hopi and Navajo Indians that were studied in 1949. These Indians subsisted on what nutritionists generally described as a very poor or limited diet. Over 36,000 of them were studied at the Mission Hospital at Ganado, Arizona. They showed an age-adjusted incidence of cancer lower than 2 per cent of that of the surrounding white population. This was reported in the Journal of the American Medical Association and by the Associated Press. A recommendation for the more intensive study of this population was made and implemented—to a degree. It was found that the diet of such Indian enclaves was "very poor" and contained a large quantity—from time to time—of potentially toxic foods that are extremely rich in cyanogenetic glycosides (nitriloside, B-17). Choke cherries and mountain mahogany berries were two foods very rich in "derivable cyanide" that the Indians were counselled to avoid. The modern American Indian generally now lives on a fully Westernized diet; his incidence of cancer, age-adjusted, has now risen over 102 per cent—slightly in excess of that of the white population. The diet of the modern Indian is free from vitamin B-17 for all practical purposes.

Some critics of these rough epidemiological data have pointed to the fact that the Southern Black population within 17 years of its migration to the North consequent to the dislocations of World War II show a cancer incidence 17 per cent higher than similar white migrants. These figures are not questioned. What is overlooked is that such migration inadvertently imposed a dietary deprivation of vitamin B-17 (nitriloside) when black-eyed peas (Garbanzoas, chi-chi peas, etc.), fresh lima beans and mung beans, as well as cane sorghum, milo, millet, and often buckwheat—all highly nitrilosidic foods—were replaced by wheat products and refined sugar and other foods totally devoid of vitamin B-17 (nitriloside).

It has been suggested that the ideal epidemiological study of the relationship between the dietary intake of nitrilosidic foods, or vitamin B-17, would involve a modern population with the same age, sex, occupational, culture, educational, ethnic or racial, social, economic, political, and similar profiles as the population at large; but distinguished from such by some identification that would be in itself totally unrelated to the possible etiology of cancer. Such a population, ideally, would live in a normally polluted area occupied also by the "control population." In Southern California, not the least of polluted areas, there is such a population. It represents 100,000 members of the Seventh Day Adventist Church. This population meets all of the criteria listed above for an ipidemiological study of cancer.

There is only one variable in this population. It is vegetarian. In the place of animal products this population must turn to food of the plant or vegetable kingdom. This means eating three to four times the quantity of plant or vegetable food than the population at large. If vitamin B-17 (nitriloside) as the anti-neoplastic vitamin were determinative in preventing the development of cancer in

man and animals, this population should show a lower total incidence of cancer because of the fact that it blindly ingests three to four times more potentially nitrilosidic vegetable food than the surrounding omnivorous population. Predictably such a population could not be expected to show the total immunity to cancer seen in the Hunzakuts, the aboriginal eskimos, wild animal populations, and the like because retrospective studies on the vitamin B-17 (Laetrile) content of the fruits and vegetables ingested by the Seventh Day Adventist population show their diet still to be highly deficient in vitamin B-17—though perhaps 8 to 14 times richer in vitamin B-17 than the general dietary pattern of the non-Seventh Day Adventists. As closely as we may determine, the Seventh Day Adventist diet does not provide more than an average of 4 to 7 mg of vitamin B-17 (about 1/12 that of the Hunzakut diet) a day.

Extensive epidemiological studies conducted by the University of Southern California Medical School and Loma Linda University School of Medicine show that the total incidence of cancer, age-adjusted, in the Seventh Day Adventist population is *70 per cent lower* than that of comparable non-Seventh Day Adventist populations living in the same areas.

But if vitamin B-17 is the specific antineoplastic vitamin it should be *experimentally* demonstrable as such not merely in the pure crystallized form as Sugiura utilized in his five successful studies at Sloan-Kettering Cancer Center, but it should also show its antineoplastic effect in animals that develop cancer spontaneously; and it should show these effects when compared to carefully selected controls in which all factors are constant except the presence of a specific food rich in vitamin B-17. Moreover, in the study of such animals, the variable of artificial manipulations—the intrusion of the artifacts of the experimental technique itself—should if possible be minimized or even totally avoided. The animals should neither be force fed by gastric tube or the like or be so deprived of ordinary food as to be impelled to the nitrilosidic food. The only impulsion toward such should be instinctual and within a context of a diet supplying limitless quantities of carbohydrates, fats, proteins, all the trace minerals and all of the vitamins with the exception of vitamin B-17. Then if animals so maintained voluntarily choose, in the case of the experimental group, to eat some of a single nitrilosidic food placed in the experimental case (and being the only factor lacking from the control cage) then such nitrilosidic food meets the requirements of being a voluntarily chosen food source. Bitter almonds provide an excellent nitrilosidic food for such an experiment because rather than being sweet they are of a bitterness that normally repels man and animals.

All of these criteria are, of course, satisfied in the aforecited study by Reitnauer (Arch. Geschwulstforch, 42 (4):135-137, 1974) reported in his paper on "Prolongation of Life in Tumor-Bearing Mice by Bitter Almonds;" in summary, "In mice with ehrlich ascites carcinoma, bitter almonds taken in addition to standard food in a free food choice caused a significant prolongation of survival time associated with an inhibition of tumor growth." This is the same general effect shown by numerous laboratory studies with pure vitamin B-17 injected into rats and mice bearing spontaneous cancer, transplanted cancer, and/or transplanted human cancer. These observations are consistent also with the numerous reports of the clear antineoplastic action of B-17-rich fruit seeds in man and animals, which action has been described as paralleling that observed for crystalline vitamin B-17.

If the action of vitamin B-17 is a surveillant antineoplastic one, then the effect exerted against neoplasia in man and animals would predictably be most apparent in the case of very small or clinically imperceptible concentrations of definitively

malignant cells, such as are seen in metastases in their incipiency. This is congruent with Sugiura's observation that injected vitamin B-17 reduced the incidence of lung metastases from primary mammary tumors more than 70 per cent as compared to controls not receiving Laetrile.

* * *

If animal and human cancer are the focal expression of a systemic dietary deficiency in a specific vitamin, then one might expect to find for all other vitamin deficiency diseases in populations deficient in the relative vitamin a pandemicity similar to that found in the West for cancer. Vitamin C or ascorbic acid deficiency affords an excellent historical parallel. The earliest account of scurvy dates back to the Crusades. The following excerpt from Harris is illuminating: "Admiral Sir Richard Hawkins mentioned, in 1593, that 10,000 men had died from scurvy in his own personal experience" and "when Vasco da Gama sailed around the Cape of Good Hope in 1948, 100 of his men out of a crew of 160 perished from scurvy. During Cartier's second voyage to Newfoundland in 1535, scurvy broke out and soon 100 of 103 of his men were very sick and 25 died."

It will be noted with this deficiency disease that the incidence in a given population was, we know retrospectively, proportionate to the extent and duration of the ascorbic acid deficiency. For example, during Cartier's second voyage only one-quarter of the crew died from scurvy. This is almost identical—a little lower—that the proportion of the total population of the United States who die from cancer in the presence of a fulminating, but not total, deficiency of vitamin B-17 (Laetrile). Vasco da Gama's venture accounted for a mortality rate almost twice as high as Cartier's. In 1804, finally the British Navy regulations required a daily ration of lemon (lime) juice. (Subsequently all of the slow sailing vessels were dubbed "lime juicers.") With the commencement of the artificial feeding of children what was once "sailors' calamity" soon became known as "babies' calamity."

Let it be noted that the scientific rationale for the antiscorbutic activity of lemons, lime and the like were just as mysterious for over 100 years to the British as the ceremonial insistence upon the incorporation of high concentrations of apricot and their seeds and kernels still are in the dietary of the Hunzakuts, a people who demand that a marrying daughter have dowry of at least 8 apricot trees; a people whose priests dispense to the population periodically draughts of apricot seed distillate. This is done with care by the priests because the concentration of cyanide in such potions is very high.

While it is true that the first use of amygdalin or vitamin B-17 in the pure form goes back to a professor of surgery at the University of Moscow, who published his successes to a sceptical medical world, some might argue that after even the British Navy in 1804 made the use of lime juice mandatory, the disease of scurvy in the general population in all civilized countries would disappear; and that certainly the medical world would now consider scurvy a completely preventable and curable disease—one cured and prevented by something in lime and lemon juice. Contrast this to the lag of almost 50 years that has occurred in the Laetrile (vitamin B-17) controversy, some point out.

The lag between certain proof of the antineoplastic action of a factor in apricot seeds or kernels and our present discussion is less than 50 years. Shortly after my father graduated from medical school and became affluent enough to purchase Sir William Osler's nine volume "Osler's Modern Medicine," he did so. This work by the Regius Professor of Medicine at Oxford was then recognized as probably the

best and most authoritative in the English languate at that time. On page 894 of vol. I Osler discusses scurvy. Under cause or etiology he wrote:

> "The true causation of scurvy is still rather obscure. It will be convenient to consider in order the different views that have been entertained:
>
> 1. That scurvy is due to a deficiency of potassium in the blood
> 2. That scurvy is caused by a diminution in the alkalinity of the blood
> 3. That scurvy is caused by ptomaines
> 4. That scurvy is the result of a specific infection—this view has been recently gaining ground."

Osler continues, "It seems probable that whilst a deficiency of fresh vegetables, i.e., of organic salts of potash, plays a part in the production of the disease by reducing the alkalinity of the blood...it is not unlikely that upon the soil so prepared there is grafter *some specific infection* which finds access to the body by the mouth. Insanitary surroundings, overwork, mental depression, and exposure to cold and damp, facilitate the development of the disease by lowering the resistance of the patient."

Thus in 1907 and a number of years thereafter scurvy was still considered to be a disease of an infectious nature resting, perhaps, on a poor dietary basis, "alkalinity in the blood," and the like.

The status of scurvy as "a chronic metabolic disease" had not yet been defined because of speculation on its being an infectious disease.

This may seem a selected example; therefore, we consider beri-beri, a disease now known to be caused by a lack or deficiency of a specific vitamin—thiamine or vitamin B-1. Of this disease Osler wrote ("Osler's Modern Medicine," Vol. Vii, p. 31—"Infectious Diseases...Beri Beri (Kakke). "In spite of the failures to isolate in beri beri a specific organism as the cause of the disease, the evidence is decidedly in favor of the view that beri beri is an infectious malady. It has frequently been observed that the importation of a single case or of a few cases of the disease into territory heretofore free from it has been followed by extensive general outbreak, though the environmental conditions, *the food supply, the nutrition of the population,* etc. had not undergone any changes." (emphasis, ours.)

Osler continues with the discussion of this "infectious" disease: "A number of investigators have laid claim to the discovery of a specific microorganism for beri beri, as DeLacerda, Taylor, Rost, Ogata (bacilli), Van Eecke (a coccus), Pekelharing and Winkler (a bacillus and coccus), Wright, Dangerfield (cocci), Glockern (an amoeba), and Fajzrdo (a hematozoon)." Twelve pages are given to the discussion of this "infection." Under Treatment: "There is no specific treatment. The patient should be confined to bed...It is important to guard against heart failure and often unexpected grave cardiac complication. It has generally been found very advantageous to administer saline laxatives in large doses during the first stage of beri beri. A favorite Japanese prescription is the following:

Magnesii sulphatis.....30 to 50 grams
Acidi nuriatici diluti.....1.5 to 2.0 cc
Tincture amarae.....4.0 cc
Aq q s ad.....200.0 cc

30 cc (1 ounce) three times a day

Other drugs recommended are cream of tartar, infusion of senna, Carlsbad salts, oleum rinci and aloes and jalap in the form of pills...Scheube has strongly recommended the use of digitalis...Baelz frequently observed good results from large doses of cocaine given in amounts of 1 to 3 grains per day...While the pulse is still good, encouraging results have been obtained by bleeding, to the amount of several hundred cubic centimeters. However, when the pulse has become weak this is dangerous, on the account of the possibility of sudden heart failure."

It will be noted that when this authoritative work on medicine—the most authoritative in the Western world—was published it reflected progressive medical consensus.

It is true that there were a number of vitriolic condemnations that appeared about the same time against such "quack nostrums" as the simple use of rice bran and rice polish or the watery infusions of such. These condemnations were almost as severe as those levelled against the use of apricot seed or kernels or their derivative of vitamin B-17 (Laetrile) in animal and human cancer...Vitamin B-1 or thiamine was, of course, subsequently isolated in crystalline form from such rice bran and polish. Thiamine was found to be a bitterish, non-toxic, water-soluble accessory food factor.

* * *

But it might seem that the examples of vitamin C in scurvy and vitamin B-1 in beri beri are special or selected ones.

Consider pellagra, a specific dietary deficiency disease caused by the lack of niacin in the diet; the lack of niacin-bearing vegetables. Looking at Vol. VII of "Osler's Modern Medicine," p. 139, we find:

> "In 1906 there were said to be 72,000 individuals in Italy *infected* with pellagra" (emphasis ours)
>
> "Searcy, in 1907 (Jour. Amer. Med. Assn., 1907, xliv, 37) published a report upon an epidemic of the acute type of this disease, occurring among the inmates of the Mount Vernon Hospital for Colored Insane, in Alabama, United States of America, with the high mortality of 64 per cent. The out-break, in which eighty-eight of the patients were affected, was traced to the use of diseased meal."

Like all other then "infectious diseases," such as scurvy and beri beri, several organisms were reported as being the "infectious" agents in pellagra.

It will be noted that the death rate from *typhus pellagrosus* "infection" was 64 per cent in a single "epidemic outbreak."

* * *

Scurvy, beri beri, and pellagra might be criticized as selected examples of "infectious diseases" that have proved diseases caused by a *specific* dietary

deficiency in a single non-toxic, water-soluble accessory food factor. Let us consider then a disease that Sir William Osler tentatively considered to be a metabolic or chronic disease—in accord with what was then medical consensus. We refer to pernicious anemia ("Osler's Modern Medicine," vol. iv, p. 614). Osler considers the following causative factors:

1. Pregnancy and the Puerperal State
2. Syphilis
3. Malaria
4. The menopause
5. Atrophy of the gastric tubules
6. Gastero-intestinal sepsis
7. Intestinal parasites
8. Chronic diarrhoea
9. Nervous shock
10. Hemorrhage

On p. 635 Osler writes: "This small group of cases demonstrates the *possibility* of recovery, but when we consider that these are but six cases in 1200 in which recovery is known to have occurred, the frightful mortality of the disease under our present treatment is obvious."

Before discussing "therapy," Osler points out: "There is no evidence so far that any special diet has influence upon the course of the disease."...As for "treatment": "Arsenic, given in the form of Fowler's solution, or in pill, is the drug upon which the vast majority of physicians still rely."

All of these erstwhile "infectious diseases" that were incurable with mortality rates approaching 100 per cent have all found total prevention and cure not in drugs but in specific water-soluble accessory non-toxic food factors or vitamins. As a matter of fact, no chronic or metabolic disease has ever found any other resolution. These non-toxic factors found in the diet act both to prevent and to cure.

V

SLOAN-KETTERING/MEXICO CORRESPONDENCE

MEMORIAL SLOAN-KETTERING CANCER CENTER
1275 YORK AVENUE, NEW YORK, NEW YORK 10021
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Office of President and Director
Sloan-Kettering Institute

January 24, 1975

Dr. Mario Soto de Leon
Centro Hospitalario "20 de Noviembre"
Av. Coyoacan y Felix Cuevas
Col. del Valle
Mexico 12, D.F.

Dear Dr. Soto:

It was indeed a pleasure to have you and Dr. Sanen visit our Institute and share with us your clinical experience with Amygdalin in cancer patients. I was pleased to hear from Dr. Sanen that our proposed collaborative controlled trials have the approval of your hospital. We are looking forward to a fruitful exchange of information.

My best wishes,

Sincerely yours,

Lloyd J. Old

Lloyd J. Old, M.D.
Vice-President and
Associate Director

VI

TOTAL METABOLIC THERAPY

THE COMMITTEE FOR FREEDOM OF CHOICE IN CANCER THERAPY, INC.
146 MAIN STREET • SUITE 408 • LOS ALTOS, CALIFORNIA 94022 • (415) 948-9475

TOTAL METABOLIC THERAPY

The layman who has perceived the promise these Sloan-Kettering tests signify, may feel the solution to his or a friend's cancer is simply to obtain from any source a supply of Amygdalin and hope his disease will then remain under control. Clinical experience shows the chances of success for this incomplete form of treatment is extremely poor.

One of the most important aspects of the whole battle against cancer is to understand the absolute necessity of discouraging any individual from treating himself, or accepting medicine or treatment from anyone other than a licensed doctor.

In order to understand from a medical standpoint why laymen should not try to treat or distribute Laetrile to patients, it is necessary to review some of the problems of both the patient and physician.

FIRST: Dispensing and prescribing Laetrile as a non-specific metabolic agent is totally legal for the licensed medical practitioner, and he has the knowledge and ability to obtain material of a high pharmaceutical quality. Dispensing or prescribing any medication by a layman may lead to severe legal consequences, and the quality, source, and efficacy of any medication received from a layman should always be suspect.

SECOND: There is more, "much more," to treating a cancer patient than merely giving him Laetrile. One of the most important considerations is the immunological defense system. The patient may, for instance, have a trace mineral deficiency, a thyroid problem, low blood pressure, high blood pressure, toxicity condition—either related or unrelated to a specific disease—and a physician could go on for several pages on what might be causing some metabolic imbalance. The point is, unless the patient receives "Total Metabolic Therapy" their chances of survival are greatly reduced.

THIRD: Diet plays a very important role in total physiological metabolic therapy. This diet may be varied from patient to patient, depending on their individual systems or needs.

FOURTH: Dosage levels and duration will vary, depending on many factors, including type, progression and condition of the patient.

FIFTH: The spirit or will to fight needs to be "braced up" and the difference can very easily be the difference between life and death.

For all the above reasons, the treatment of a chronic metabolic disease, like cancer, can only be handled by an informed licensed medical practitioner,

using all the resources of the medical community; anything less is gross disservice to the desperate patient and a potential failure for metabolic therapy.

In order to stop the distribution of inferior Laetrile, the Committee set up the first national service for testing Laetrile (B-17) for patients and physicians, and as of this writing we are still getting inferior quality or quantity material from many parts of the country. Inferior material not only results in many deaths (we have many instances of people who have brought their metabolic disease under control and died after leaving the physician's care), but hurts the whole fight when a doctor tries Laetrile for the first time and comes to the conclusion that it has no value as a metabolic agent. There are at least a couple of instances where we strongly suspect that the source of defective material comes from those who have a vested interest in keeping Laetrile illegal.

Laetrile may be used legally by a licensed physician as a non-specific metabolic agent. This has been definitely established in court.

The Committee maintains a complete referral service of doctors and clinics throughout the country and the world who can competently provide metabolic therapy, including Laetrile.