Recurrent Breast Cancer Treatment via Rapid Pain-Guided Experimentation

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Abstract – Recurrent breast cancers present a special challenge. Spawning from mutated surviving cancer cells or oncogenic cysts, they tend to be aggressive and malignant, and many have mutated to circumvent measures that killed an earlier tumor, so survival rates are negligible.

There is a brief window of time, starting when tumors first become painful, and ending when they have grown enough to do sufficient damage to surrounding tissues so that pain cannot be quickly stopped. When tumors are exquisitely sensitive to their internal pressure, it is possible to quickly test prospective adjuvant therapies and receive immediate feedback as to their efficacy in the form of prompt reduction or elimination of pain.

This paper concentrates on rapidly adjusting body temperature, in the hope and expectation that a temperature can be found where a dormant component of the immune system will awaken and attack the cancer.

Keywords: stage 4, recurrent breast cancer, body temperature, thermotherapy, pain, low-dose challenges

1 Introduction

Jane, a breast cancer "survivor" residing in the UK, spends much of her time working with people who are trying to survive their own cancers. Jane had fixed all of the factors known to contribute to a recurrence, including cleaning up her diet, taking all cancer-fighting supplements purported to help, raising her body temperature, etc. So, when a tumor and several enlarged lymph nodes developed nearly seven years after she thought she had been "cured", she knew she was in a fight for her life, because there was literally nothing else left to fix. Further, just two days after their discovery, Jane's tumor became severely painful.

Desperate times beget desperate measures. Recurrent cancers often quickly kill their hosts - before there is even time to receive competent cancer treatment. The majority of the work described herein was done before Jane's first available oncology appointment.



Fig. 1: Metastatic tumor in left armpit shown in actual size. In 2 weeks this tumor shrunk leaving no visible bump. Previous mastectomy scar is shown in lower left.

Steve Richfield is currently the only known Central Metabolic Control Systems (CMCS) therapist, specializing in changing various CMCS set-points, most commonly body temperature. This project is unusual because it involves finding previously unknown set-points, and altering Jane's day-time temperature to values other than the usual $37^{\circ}C=98.6^{\circ}F$.

2 Recurrent Breast Cancer Biology

The most commonly accepted theory is that surviving cells mutate to form tumors that are more problematical than the original tumor. Here, tumors are often found in clusters of successively mutated cells that sometimes respond differently to treatment.

A very common treatment for breast cancer is a mastectomy (removal of the breast along with many lymph nodes). Without lymph nodes, exudate from surrounding tissue collects in a cyst the body forms to hold them. Then, one of two things happens:

- 1. the body is NOT able to extract small molecules from the exudates fast enough to keep up, so the cyst grows without limit, becoming lymphedema, or
- the body IS able to extract small molecules from the exudates fast enough to keep up, so the exudates becomes concentrated in a sort of primordial soup in an oncogenic cyst, from which new forms of life emerge – including aggressive cancers.

The sad irony here is that the patients who do NOT contract lymphedema, often because they are very careful not to use their chest muscles on that side, are seen as the "lucky" ones, when it is they who proceed without symptoms until they develop an almost universally fatal tumor. The patients who develop lymphedema receive treatment to get their cysts drained and flushed, and so they have better survival prospects.

Jane had no lymphedema before her tumor developed, so it came as no surprise to learn her worst tumor was covering the top of her oncogenic cyst. However, upon ultrasonic examination it was found that Jane had a cluster of three tumors. Hence, the genesis of this particular cancer won't be determined until differences in response to treatment are seen, or not seen.

3 Immune Subsystem Selection Biology

Immune systems operate via complex enzymes - the MOST complex enzymes that it is possible to construct given 100 millions years of evolution. The thing that establishes the upper limit to the complexity of chemical reactions is temperature range – as reactions become more complex, their temperature range becomes narrower, with the result that some parts of our immune systems only operate at one specific temperature with no remaining "range". Hence, components can be individually selected by adjusting body temperature.

As a result, people must have changing temperatures for everything to work right, with most healthy people sleeping at $36.3^{\circ}C\approx97.4^{\circ}F$ and rising to $37^{\circ}C=98.6^{\circ}F$ during the day.

Some (rare) people with cancer spontaneously run fevers which usually kill their tumors. However, it is suspected that these fever temperatures may frequently change to activate the multiple mechanisms needed to kill the most robust tumors and invaders. There are good reasons for saving some immune subsystems for when all else has failed - to avoid "helping" tumors and invaders to evolve to the point of being able to avoid an immunological attack. To avoid such evolution, our CMCS does NOT ordinarily activate some last-resort parts of our immune systems. This is why our CMCS waits for a major attack of some sort before resorting to running a fever, instead of cycling to fever temperatures all of the time.

4 How Temperature Set-points Work

Everyone has an assortment of the same temperature set-points distributed approximately every 0.33°C=0.6°F from each other, somewhat like a rotary switch with stable detents (catches), similar to an old fashioned television tuner channel selection switches where each channel is different. Each set-point temperature works differently. Most healthy people end up using every other set-point, e.g. 36.3°C≈97.4°F and 37°C=98.6°F, while skipping the intervening set-point at 36.6°C≈98.0°F, much like alternating television channels are assigned. People's brains decide which set-point to use at any moment in time, switching abruptly between them as needed. With a little practice, most people can sense these changes as slight momentary chills or flushes that have become so familiar that they are no longer noticed. Absent extreme circumstances, most people spend nearly all of their time at just two or three of their set-points.

Set-points are easily measured by adjusting the ambient temperature for perfect comfort and measuring body temperature. That many people have found the same set-points confirms that these are the same for everyone.

With some practice, most people can learn to observe physiological clues and guesstimate their temperatures to within $\sim\pm0.1^{\circ}C\approx0.2^{\circ}F$ without using a thermometer.

Various things commonly go wrong with temperature regulation, the most common being central hypothermia. Therein, superstitious learning, most often from previous general anesthesia having "frightened" the CMCS into never again operating at the same temperature, makes it impossible to utilize much of the normal range of body temperatures. This "red tagging" blocks the use of a particular set-point, and usually all other set-points above it, thereby disabling many of the capabilities of a person's immune system. This was clearly the problem for Jane when she developed her original breast cancer seven years earlier.

The present project involved searching for previously unknown set-points, which turned out to be at $37.4^{\circ}C\approx99.3^{\circ}F$ and $37.7^{\circ}C\approx100^{\circ}F$.

Note that the Fahrenheit temperature scale was originally created so that 100°F would be normal body temperature. Perhaps the German physicist Daniel Gabriel Fahrenheit (1686–1736) lived much of his life at the $37.7^{\circ}C\approx100^{\circ}F$ set-point, which might help explain why he only lived to be 50.

These two previously unknown set-points were found by Jane when she raised her temperature in a sauna up to $38^{\circ}C\approx100.5^{\circ}F$, and then ever so gradually lowered her temperature over the course of several hours, as she carefully watched for indications of an active set-point. The primary indication turned out to be feelings of thermal comfort.

5 History – Round 1

From 2005 to 2009 Jane had many symptoms of low thyroid function and increasingly had cachexia (wasting syndrome). Blood tests revealed nothing wrong. June 2009 Jane was diagnosed with a 4cm ductal invasive carcinoma of the breast. Jane still had cachexia, which her oncologist said was unrelated. Jane's treatment was a mastectomy and 6 bedridden rounds of chemotherapy. These treatments were traumatizing to Jane. Fearing for her life, Jane decided not to have radiotherapy or aromatase inhibitors. Jane still had cachexia. Blood work still revealed nothing and Jane was becoming dangerously ill. Suspecting that her abnormally low body temperature might be the underlying cause for all of her problems, Jane contacted author Steve Richfield for assistance in normalizing her body temperature. Jane's cachexia and other symptoms soon resolved.

6 History – Round 2

Nearly seven years later, Jane began feeling discomfort in her armpit in the region of her previous mastectomy. Two months passed before serious pain began. Initially the pain was barely perceptible, a little twinge, a little tightness, then the discomfort prompted some gentle manipulation which revealed two lumps. One lump was located under Jane's left armpit and measured about 3cm wide and 1.5cm deep. The other was a lump which could float across a rib. This lump was 1.5cm wide and 0.5cm deep. Other "minor aches and pains" could possibly have been other metastases. The pain was becoming unbearable, prompting Jane to seek help from the medical system and author Steve Richfield.

Jane had not stuck with her original temperature maintenance program. She had allowed her daytime temperature to drop as part of a plan to save money by not adequately heating her home. Living life between set-points can be even more dangerous than living life at the wrong set-points, because at a wrong set-point, at least some part of your immune system has been selected to be active. Now Jane was probably suffering from the expected consequences.

A careful review of Jane's past lab tests disclosed a thyroid panel showing that her TSH, FT4, and T3 were all nearly at the bottom of their respective ranges. Since Jane was clearly metabolically challenged (which is one of the suspected causes for her present cancer), the only apparent explanation seemed to be some sort of pituitary or hypothalamic malfunction for which there is no known direct intervention. Jane discovered she felt better when she tried some low-dose T4, but full T4 supplementation is well known to short-circuit thermotherapy efforts by forcing temperatures to $36.6^{\circ}C\approx98.0^{\circ}F$.

7 The Plan

The plan started out simply – to stay alive and relieve pain long enough to secure competent help, possibly including surgery to remove the painful tumors. NSAID pain relievers had no apparent effect. Jane immediately went on a "zero carbohydrate" ketogenic diet, but its effects are too slow to evaluate. Jane started eating apricot kernels on hand, only to develop symptoms of cyanide poisoning, so she reduced her dosage. To help generate the heat needed to maintain a higher temperature, Jane utilized T2, T3, and T4 supplements. Jane ordered some dichloroacetate (DCA), but it apparently got hung up in British customs for several days. Taking the DCA seemed to reduce the pain, but there were too many other things happening to be sure.

Jane entered her sauna and observed how she felt at various body temperatures. It became apparent that at some specific temperatures above 37°C=98.6°F the pain was greatly reduced and often completely gone.

With temperature manipulation being the only thing that seemed to help, efforts focused on temperature manipulation.

8 Challenges

No one knows what parts of the immune system are activated by various temperatures. This probably changes from one person to the next because people have differing immune systems. Further, killing a difficult tumor could require cycling between several unknown temperatures.

Supporting this theory, raising Jane's body temperature to $37.4^{\circ}C\approx99.5^{\circ}F$ was first observed to eliminate pain – but it gradually returned until switching to $37.0^{\circ}C=98.6^{\circ}F$ or $37.7^{\circ}C\approx100^{\circ}F$. Fighting cancer is clearly a complex time-dependent process.

To address this complexity, a pragmatic approach of "if it hurts, change the body temperature" was adopted. After just one day, several temperature set-points seemed to develop their own individual personalities. However, both people and tumors are unique, so take Table 1 as an example and NOT as a reference.

Table 1:	Jane's Sta	ble Oral T	emperature
Se	et-points vs.	Observed	l Pain

35.9°C≈96.7°F	PAIN
36.3°C≈97.4°F	Sleep without pain.
$36.6^{\circ}C \approx 98.0^{\circ}F$	Increases pain.
37.0°C=98.6°F	Doesn't seem to change pain.
37.1°C≈98.8°F	Gradually decreases pain.
37.4°C≈99.5°F	Usually decreases/eliminates pain.
37.7°C≈100°F	Always decreases/eliminates pain.

Yoshimizu^[1] discusses (on page 82) Dr. Frank T. Kobayashi getting improvement in 70% of his cancer patients by briefly heating them to $39-40^{\circ}C\approx102-104^{\circ}F$ for two hours while simultaneously administering just 5-10% of the usual doses of chemotherapy. This was presumably done without real-time experimentation with these or other temperatures.

9 Misleading Effects

There are several ways to briefly reduce cancer pain and potentially mislead rapid experimentation, which should be kept in mind to avoid being misled.

- Lower metabolism, e.g. from heating, restricted diet, etc., can retard tumor growth and stabilize tumor pressure.
- Dehydration can cause water to be removed, resulting in reduced tumor pressure.
- Lower blood pressure, e.g. from blood pressure medications, can reduce how much the heart pumps up tumors.

Hence it is important to also watch other indicators like tumor softness, sensitivity to applied pressure, tumor size, etc.

10 An Epiphany

Maintaining desired temperature proved to be increasingly more difficult because Jane developed extreme hot flushes that drenched her. Suspecting her CMCS was alerting over some unknown bad situation, a survey of temperatures around her body showed that her body was $0.65^{\circ}C\approx1.2^{\circ}F$ cooler than her head.

This means Jane's temperature measurements were of Jane's head and NOT her body where her tumors are situated. Adjusting for this temperature difference, it became clear that Jane's body, but not her head, has been in the 35.something°C \approx 95.something°F range which is typical of the vast majority of cancer cases.

Jane's central hypothyroidism that would be expected to impair heating of her organs, as evidenced by her low FT4 and T3, Jane tried heating her body while simultaneously cooling her head. This worked amazingly well, with Jane's head then easily rising to $37.1^{\circ}C\approx98.8^{\circ}F$ without medication, the difference between head and body temperature cut in half, and hot flushes becoming barely noticeable.

Understanding and effectively addressing Jane's central hypothyroidism will be needed before Jane can stay alive without dressing for a Siberian winter while fanning her face. Conventional treatment via T4 supplementation doesn't work because it causes her temperature to drop. The following tests are now planned:

- TRH Challenge to assess pituitary function
- IGF-1 to assess pituitary function
- MRI to look for pituitary and hypothalamic tumors

However, it is likely that no laboratory test will find a malfunction, because the malfunction may be just another superstitious learning artifact from the same exogenous cause (e.g. general anesthesia as a child) that caused her central hypothermia that lead to her original breast cancer.

Kokolus, et al, have observed that chemotherapy often causes subsequent hot flushes. Perhaps some chemotherapy agent(s) cause damage to the hypothalamus or pituitary leading to central hypothyroidism. This would not be surprising because chemotherapy is well known to cause cognitive impairment, sometimes called "brain fog", and there are many delicate sensing neurons in the hypothalamus and pituitary. Someone should do the research to identify the chemotherapy agents used on patients who subsequently developed hot flushes, as this appears to be a dangerous but previously unrecognized side effect of some common forms of chemotherapy.

11 Turnaround

Starting her day with a brief session in a cabinet that only heats her body while a fan cools her head, and upping her T2 intake, Jane now feels GREAT with her only remaining symptoms being her now-painless shrinking tumor and some mild liver discomfort, hopefully from processing lots of recently killed cancer cells. Jane's head and body are now at the same 37.1°C≈98.8°F temperature, even after she left her cabinet. Jane now has the energy to clean her house and catch up on her many chores that have gone undone while she has been so sick.

12 Examination

Just before the cutoff time for publication, Jane finally managed to have an oncology examination including an ultrasound scan of her tumor. Jane's "tumor" is actually a cluster of three tumors. Further, one of the tumors extends between her left-side ribs and into her body, and hence is inoperable. Irradiating her heart would not be good, and besides, there are probably other tumors in remote locations. Chemo would be expected to have poor results against such an aggressive tumor in a patient who has already received chemo for a past tumor, and who has reacted so badly to chemo in the past. Jane's present thermotherapy is clearly working better than any of the other conventional cancer treatment could work.

13 Unexpected Encouragement

The day after her oncology exam, Jane discovered an apparent small metastatic tumor in the cuticle of her thumbnail. Having already lived longer than she expected when her adventure started, a new tumor HERE, on the coldest part of her body rather than at a much more problematical location, further supports the proposition that temperature is holding other tumors at bay and/or is killing them.



Fig 2: Probable early metastatic tumor in thumbnail cuticle, when noticed and two days later, shown twice actual size.

The wonderful thing about this particular tumor is that it greatly facilitates further experimentation, e.g. testing at difficult-to-attain temperatures, before considering prospective techniques to achieve those temperatures across an entire body.

Yoshimizu^[1] reports (on page 71) that most cancer cells can survive immediate destruction to ~42°C≈108°F whereas healthy cells survive to 47°C≈117°F, providing a thermal window to destroy cancer cells. However, the temperature required to kill cancer cells is doubtless dependent on the specific mutations involved. Note that this report addresses cellular <u>survival</u> and not <u>functioning</u>, as these temperatures exceed those known to cause brain and other damage. Hence, whole body incineration of tumors without relying on immune systems does not appear to be practical.

14 Results

The primary reason for rapid real-time experimentation is to **<u>quickly</u>** learn what works, without introducing the traditional "noise" of individual patient survival statistics by counting noses and headstones. This means that the usual measure of results, patient survival statistics, is rapidly becoming an obsolete measure. However, patient survival remains VERY important for those involved, most especially the individual patients. Jane's tumors have clearly shrunk – to around half their peak size, or $1/8^{th}$ their original volume as of this writing. However, shrinkage has not been steady. When she wakes up in pain, she observes her tumors have increased in size, but they then shrink again when she raises her temperature and eliminates the pain. Measurement is made by placing a piece of tape over a tumor and pushing a pen into the tape as she goes around the tumor.

More will be learned by the time this paper is presented at WORLDCOMP. With luck, Jane will be able to attend the WORLDCOMP conference and discuss the events presented here from her first person point of view.

15 Conclusions

15.1 Viability of Rapid Experimentation

Rapid experimentation clearly works for treatments like thermotherapy and some chemotherapy, where early results can be immediate.

Rapid experimentation probably works best on aggressive tumors that quickly "recover" from successful treatments.

Rapid experimentation clearly does NOT work for treatments that have slow response times, like dietary interventions.

Rapid experimentation testing of new substances on several patients might facilitate a screening process for prospective new therapies.

15.2 Viability of Thermotherapy

Short-term thermotherapy without precise temperature control has been studied as a cancer treatment by Yoshimizu^[1]. At risk of oversimplification, he seems to say that its greatest value is as an adjunct to chemotherapy, where good results can be secured with only 10% of the usual doses of chemotherapy. Most oncologists seem to think that surgery is usually needed, as otherwise cancer cells can hide within tumor structures.

Thermotherapy, as part of a comprehensive plan to correct erroneous body temperature, has been successfully practiced by many people.

Thermotherapy, as an emergency treatment for the progression and extreme pain often associated with cancer, seems to be proven by our experiences reported herein.

15.3 Watch for Central Hypothyroidism

Central hypothyroidism is a somewhat rare condition where the brain fails to send hormonal signals for the thyroid to sufficiently activate. Central hypothyroidism is evidenced by simultaneously-low TSH and FT4, that may both be above the lower limits of their respective reference ranges, whereas other hypothyroidism is evidenced by elevated TSH, often accompanied by low FT4. As a result, TSH screenings for hypothyroidism completely miss cases of central hypothyroidism. However, breast cancer is also a somewhat rare condition, and the two might be related, as in Jane's situation. Until more is known, it seems prudent to perform a thyroid panel test on patients where recurrent cancer is suspected, and look for TSH and FT4 <u>both</u> being low, even if they are both within their respective reference ranges.

15.4 T2 Research Needed

There are lots of anecdotal postings on the Internet regarding the efficacy of the thyroid hormone T2. T2 is clearly not inert, as many endocrinology textbooks would have you believe. Complicating this situation is that T2 comes in several forms, as there are 4 sites on which to attach 2 iodine atoms, and competing suppliers advertise the benefits of their differing forms of T2. Research is needed to better understand the action of various forms of T2, to better guide its therapeutic use.

15.5 New Type of Chemotherapy Damage

Large numbers of chemotherapy patients developing hot flushes, coupled with the understanding of Jane's hot flushes as explained here, strongly suggest that some chemotherapy agent(s) may be causing a specific sort of brain damage that causes body temperature disturbances and/or central hypothyroidism - that might lead to future cancers. Someone should do the research to identify and ban such substance(s), though in Jane's case TAC has already been banned in much of the world – but not in the UK.

For Jane's initial breast cancer, she had the chemotherapy cocktail TAC, an acronym for:

- **T** docetaxel (also called **T**axotere[®])
- **A** doxorubicin (also called **A**driamycin[®])
- C Cyclophosphamide.

15.6 Painful Lumps as an Emergency

Emergency room personnel are ready to help people who develop chest pains, but they are NOT (yet) ready to help future cancer patients who have just developed their first painful lump(s). If hospitals were to prepare for this by having a plan to start evaluating prospective adjuvant therapies, they could utilize the brief window of time when tumors are exquisitely sensitive to pressure to determine what treatments will best kill the cancer. Immediate experimentation, even in the absence of high-tech testing, can greatly alter the future course of tumors.

15.7 Questionable Ethics of Removing Large Numbers of Lymph Nodes

Removing large numbers of lymph nodes, without transferring replacement lymph nodes (from the groin), creates a deadly oncogenic cyst and/or causes lymphedema. Transferring lymph nodes requires a special skill that is not commonly available. As a result, there are presently far more mastectomies with lymph node removal being performed, than there are doctors to transfer replacement lymph nodes, so only patients who have already progressed to the edge of death qualify for these procedures. Since the patients who do NOT develop lymphedema often instead develop quicklyfatal tumors and promptly die, this sort of "triage" greatly reduces the number of patients receiving this procedure - by killing the stronger patients.

The methods presented herein provide a new approach to sparing lymph nodes, despite the likelihood of them harboring cancer cells, because patients can now KNOW that they have a good adjuvant therapy, proven to work on their own tumors and surviving cancer cells, to use immediately and/or when their tumors have been surgically removed. With this, a surgeon can abandon procedures intended to remove all cancer cells, and instead only remove tumors, relying on the already-proven adjuvant therapy to reliably kill all remaining cancer cells once surgery has been completed. As a result, only those lymph nodes harboring tumors need be identified and removed.

16 Warnings

Alternative health literature is full of outrageous claims of new cancer "cures". However, there are nearly as many forms of cancer as there are people who have cancer, so there probably never will be a cure-all for cancer. There are LOTS of things that seem to help – for a while until the cancer mutates to circumvent ongoing measures. If you wonder whether something you read about really worked, your best first step is to contact the person who made the claims, and see if that person is still alive.

There are many people who believe the "gold standard" for curing cancer is restoring normal operation of the immune system – which Jane did with her initial cancer. Jane's experiences challenge this simplistic belief, because while her body temperature was usually a little low, it was also often $37^{\circ}C=98.6^{\circ}F$ – especially whenever she drove herself around with the heater in her car turned up high. Perhaps if UK's winter had not been quite so cold this year, Jane's immune system might have kept her cancer at bay for another month, and then killed off her cancer (yet again?) when summer heat arrived. Jane will surely pay more attention to these "little" details in the future.

You will find no cure-alls here, but you will find techniques that will facilitate each person's rapid search for their own individual cures. In the process, these methods can quickly alleviate the excruciating pain associated with cancer, though at the cost of some discomfort from raising body temperature, possibly higher than it has ever before been.

17 Future of this Methodology

For the first time, this methodology will facilitate the side-by-side comparison of competing cancer treatments ON THE SAME TUMORS. This will facilitate the search for genetic markers preferring one treatment over another, instead of searching for markers for each isolated treatment without any ability to compare competing approaches.

Using genetics to determine in advance which adjuvant therapy will work best, instead of only determining which adjuvant therapy will work at all, should propel the practice of cancer treatment beyond present-day limitations.

It is hoped that the methods presented herein will bring an end to the practice of using adjuvant therapies that haven't been pre-tested on each patient, which often does considerable harm without killing tumors.

18 References

[1] Nobuhiro Yoshimizu. "*The Fourth Treatment for Medical Refugees*". RichWay International, Inc, 2009. <u>http://www.bio-mats.com/the-fourth-treatment-for-</u> <u>medical-refugees/table-of-contents</u>

This hyperlink provides access to the entire book in 7 languages. Therein, case studies of 17 patients treated with thermotherapy show some whose temperatures spontaneously rose much as Jane has observed, despite the lack of closedloop temperature control as Jane used.

[2] Canadian Cancer Society "*Types of chemotherapy*" <u>http://www.cancer.ca/en/cancer-information/diagnosis-</u> <u>and-treatment/chemotherapy-and-other-drug-</u> <u>therapies/chemotherapy/types-of-</u> <u>chemotherapy/?region=on</u>

Should you be considering chemotherapy, this overview of chemotherapy agents will facilitate figuring out which are most likely to be of benefit in your particular situation.

[3] Kathleen Kokolus, Chi-chen Hong, and Elizabeth Repasky. "Feeling too hot or cold after breast cancer: Is it just a nuisance or a potentially important prognostic factor?". Int. J. Hyperthermia. 2010.

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC301237

This paper discusses how hot flushes from prior chemotherapy present a major challenge for breast cancer "survivors". Our experience shows that a substantial temperature difference between body and head can cause hot flushes, which are reduced or eliminated by dressing very warmly while exposing the head.

[4] Karl Groth, Theodore Kelly, Todd Westerbeck, and Gary Blick. "*Treatment of human herpes viruses using hyperthermia*". U.S. Patent 6,415,797, 2002. http://www.google.co.uk/patents/US6415797

Pay particular attention to the "EXAMPLES" section in this U.S. thermotherapy patent.