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# The metabolism of sulphur in relation to the biochemistry of cystine and cysteine: its fundamental importance in biology. A cyclic interchange between their mono- and di-sulphides is the unique reaction creating life and intelligence

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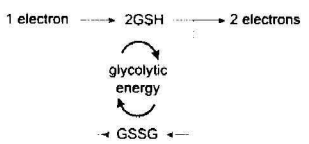
## SYNOPSIS

Uniquely, life grows exponentially, is irreversible and must reproduce these two features by a transfer process creating successive generations of life from inanimate objects. The two electrochemical reactions of oxidized (GSSG) and reduced (GSH) glutathione create a cyclic process akin to a dynamo. They are GSSG + $e^-$ → 2GSH and 2GSH → GSSG + $2e^-$.




In cyclic form, these two reactions obey all three criteria and therefore create life from non-life. It is titled $ER_{ex}$ to represent this exponential reaction creating life. Anaerobic glycolysis provides the energy to restore the thermodynamic equilibrium of the cycle. Uniquely, ionizing radiation kills cancer according to a negative exponential function which directly opposes cancer's unique positive exponential growth function. The primary target of all ionizing radiation is automatically $ER_{ex}$. This reaction $ER_{ex}$ can only proceed to exhaustion of its substrate without an equilibrium constant and with these unique characteristics it must be 'superior' to all other chemical reactions of simple form.

This superiority of $ER_{ex}$ over all other non-exponential reactions in the universe automatically creates intelligence. Evolution is therefore 'pushed' by an intelligent $ER_{ex}$ and must be of Lamarckian form. Since neurones neither become cancerous nor transmit messages electrically, this reaction must be confined to the glial cells, where it is titled $CR_{ex}$. This notation represents the chemical exponential reaction which mediates intelligence by converting methionine to cystathionine in exponential quantities proportional to time. Ultra high frequencies of 434 ± 5 MHz cause $ER_{ex}$ in vivo to fluoresce. 434 ± 5 MHz UHF before ionizing radiation may increase the latter's exponential kill of human cancer colonies by two or more decades and therefore must also primarily target $ER_{ex}$. Fluorescence and resonance of $ER_{ex}$ at these frequencies disappears within a few minutes of the host's death.

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## INTRODUCTION

### Life: logical definition from its unique dynamics

Three unique characteristics create life. These are: exponential growth proportional to time; the irreversibility of this exponential growth; and transference of these two features to create generations of life from non-life.

All non-life-creating chemical reactions have equilibria which obey the dynamics of their substrate/product concentrations. All obey the laws of constant composition, conservation of mass, energy, multiple and reciprocal proportions with preservation of random entropy. None, even in the presence of adequate substrates (with or without catalysts) ever proceeds to 100% conversion to products.

All these reactions can be expressed in binary non-exponential mathematics. Any chemical system which produces products exponentially with time cannot be reversible and will proceed to complete exhaustion of substrate. Such a unique reaction, described only by exponential mathematics, creates all living forms whose subsequent reactions must all obey conventional physico-chemical form.

### System characteristics

No single organic or inorganic molecule can be found which will provide these features. A cyclical change between two coupled molecules is the only solution to the problem of irreversibility. If A changes to B which changes to A which changes to B, etc. etc., this is an effectively irreversible system because it does not matter which way it cycles. By contrast, a cycle of three or more compounds would not guarantee irreversibility. A search for molecules A and B is therefore required to find their nature which somehow expresses exponential growth and generation creation.

### Cancer: the key to finding A and B

All cancers obey these three criteria of life. As described and proven by Laird (1), cancer in its early stages obeys true exponential growth which slows to Gompertzian growth as it enlarges. This is due to restriction of energy (food) sources as cancerous masses enlarge. Cancer cells in vivo generate new generations as they grow and whilst they may die from lack of energy supplies their death does not recreate usable energy sources, thus demonstrating their irreversible metabolic processes. The energy source of all cancer cells comes exclusively from anaerobic glycolysis which produces lactic acid (2). As Laird demonstrates, the mathematical description of life's growth is identical to cancer's growth: The start is truly exponential which then assumes Gompertzian form as body growth rate slows. In adulthood, growth is from stem cells only for replacement of effete adult cells. Cancer can only arise from stem cells.

The wasting of cancer patients is caused by the increasing demands of cancer's very inefficient anaerobic glycolysis for mitosis. Reconverting lactic acid to glucose in cancer patients who take hydrazine sulphate demonstrates that when this is done wasting ceases, but the cancer continues to grow new generations thus proving its innate irreversibility (3).

Adult neurones never become cancerous. All brain cancers are derived from glial or supporting cells within the central nervous system.

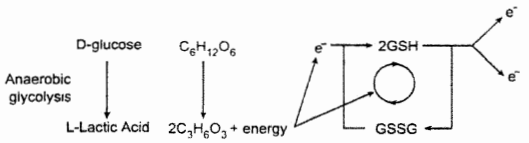
The nuclei of all cells are anoxic and, when in mitosis, the whole cell is made anoxic until the nuclear membrane is completely restored (4). The nucleus contains reducing agents which include vitamin C and reduced glutathione (GSH).

The extranuclear cell contents (ENCCs) of all cells except neurones and static (non-stem) adult cells contain both oxidized and reduced glutathione (5). This explains the absence of cancer developing from neurones and non-stem cells and why creating life by cloning can only start with a fetal or a stem cell.

## THE ELECTROCHEMICAL REACTION WHICH CREATED EXPONENTIALLY GROWING LIFE – $ER_{EX}$

The connection between 'glutathione' and glucose metabolism in normal cells was discovered by Hopkins and Elliott (6) and pursued by Needham and Lehmann (7). They showed that the first few mitoses of an embryo only required the energy of anaerobic glycolysis. This is only active in the presence of 'glutathione'. Having identified reduced glutathione (GSH) and oxidized glutathione (GSSG) Kosower and Kosower's work (8) established in 1976 the full cyclic process of 2GSH → GSSG → 2GSH.

Combining the discoveries of Warburg, Hopkins, Elliott, Needham, Lehmann and Kosower and Kosower leads to the following system:




This system is denoted $ER_{ex}$ or the electrochemical reaction creating exponential quantities of electrons with time.

Fiala et al. (9) showed experimentally that when normal liver cells become cancerous they develop an exponential increase in glutathione turnover, confirming this hypothesis.

This reaction obeys the three life criteria because: (A) each electron energizes a cycle to produce two spare electrons which will activate two new cycles and so on; (B) the transfer of an electron to two inanimate GSH molecules is the creation of the next generation of life; and (C) each half of an $ER_{ex}$ cycle produces an individual unidirectional response and so is effectively irreversible. $GSSG + e \rightarrow 2GSH$ and $2GSH \rightarrow GSSG + 2e^-$. D-glucose changes anaerobically to l-lactic acid and produces the energy needed to maintain this cycle to obey the second law of thermodynamics.

This is the situation in vivo today. In a very radioactive primitive earth, the energy of anaerobic glycolysis is unnecessary because the energy from a beta particle could balance the equation and create life. Such beta particles could have been replaced by anaerobic glycolysis before the planet produced free oxygen in the atmosphere.

### The Pasteur reaction

Pasteur (10) must be credited with the discovery of $ER_{ex}$ without knowledge of its exact nature in 1876 after studying the chemistry of beer-brewing. The Pasteur reaction or control of 'fermentation' in the presence of oxygen has been an enigma for many years. Baker (11) and Dixon (12) and others have researched the Pasteur reaction and shown that anaerobic glycolysis is inhibited in direct proportion to the concentration of GSSG.

Thus it can control its own destiny by adaptation to environment, which is the characteristic of intelligence. The Pasteur reaction is unique on earth because, when unhindered, it proceeds exponentially to 100% completion. Fig. 1 explains why fermenting sugar, e.g. for wine producing, may proceed to shattering its container: anaerobic fermentation is irreversible and like cancer is unceasing without adequate local concentration of GSSG. Every other reaction is non-exponential and is partially reversible, therefore the $ER_{ex}$-Pasteur reaction is functionally superior and will always outperform all others.

Thus GSSG exerts direct control of $ER_{ex}$ activity. $ER_{ex}$ creates an output of electrons which can only be used for mitosis and is more electrically conductive than any other part of the cell. In cancer, this reaction is autonomous because cancer is merely a process whereby the centralized control of each individual cell has been lost. Joines et al. (13) measured the electrical conductivity of cancer and non-cancer tissues and showed that the ratio of power absorbed in cancer/power absorbed in non-cancer tissues varied with the frequency. For frequencies below 2 Giga Hertz the maximum ratio is 5.16:1 at 180 MHz.

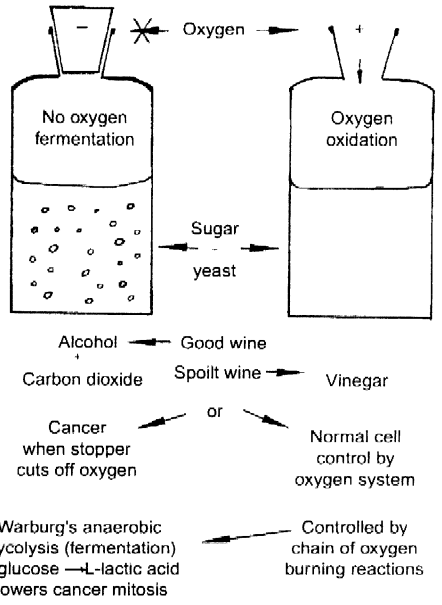



**Fig. 1 The Pasteur reaction.** Pasteur recognized the control of fermentation (anaerobic glycolysis) by oxygen. Warburg understood there was no direct connection between cancer's anaerobic glycolysis and its aerobic glycolysis. Needham and Lehmann in 1937 established that in very early embryonic life glutathione was essential for anaerobic glycolysis and Baker proved that the concentration of oxidized glutathione was the controlling agent for Warburg's anaerobic glycolysis. Yeast has both reduced and oxidized glutathione: the concentration of the oxidized form is too low to control fermentation.

### Hyperthermia (non-electrically generated)

Heat treatment has had a vogue and 27 cancer patients were treated using whole-body wax-bath non-electrical heating to the limit of liver tolerance (41.8°C) between 1968 and 1972. No selective coagulation of cancer or other cells was seen during this clinical program. There was no clinical response in any patient except relief from bone pain which could be directly attributed to simple heat. Several deaths from disseminated intravascular coagulation (DIC) forced abandonment of this method.

In 1974, 434 MHz (the European frequency for medical uses) was tried for whole-body 'heating' of 30 patients. The intratumour temperatures in these patients were measured with an implanted platinum thermometer.

Patients were treated within the near field of 12 folded dipole antennae backed by semi-paraboloid reflectors energized with a total input of 2.4 kilowatts (14). The maximum intratumour temperature recorded was in a metastatic cancer of the colon in the abdominal wall approximately 5 cm in diameter. Its central temperature

reached 43.8°C but on microscopy the cells were neither coagulated nor killed. All cancers exhibited faster growth as a result. Two observations were made in this series. Firstly at 434 ± 5 MHz any dose of electromagnetic radiation (EMR) of normal cells failed to produce any form of damage from heat or coagulation. Cancer in the soft tissues, e.g. breast, bladder, liver and brain, could not be coagulated either at any dose.

The only sites of cancer in which coagulation and heat death from EMR were obtained were in those patients with secondary cancer deposits within the marrow cavities of long bones. Figures 2 and 3 record the typical appearances of cancers so treated by this frequency EMR. In both there is complete death of all the cancer cells. The remaining cells, such as those of an acute inflammatory reaction, bone cells, blood components and the attached tendons and muscles were all microscopically normal. In such anatomical situations, this selective lethality to cancer cells is unique to 434 MHz radiation amongst every other cancer therapy.

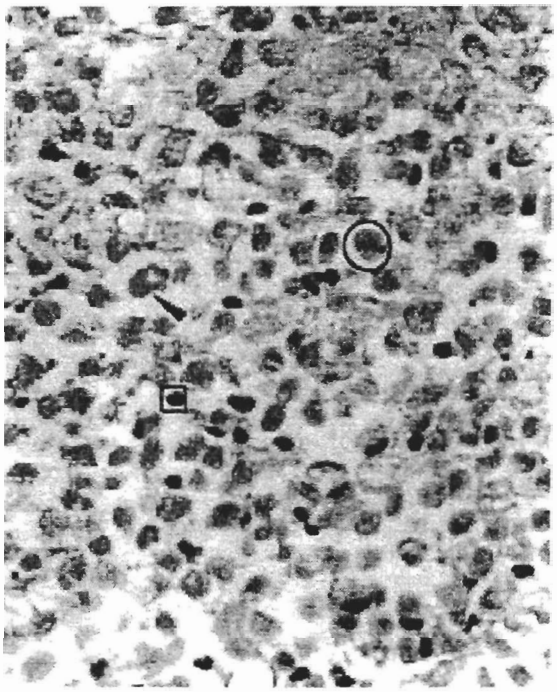


**Fig. 2** Biopsy taken 72 hours after 5 days of 434 MHz irradiation to the pelvis (2.4 kW, 20 min daily, surface intensity between 50 to 55 mw/cm$^2$). *Arrowed*: a typical extranuclear cell content coagulation or poached egg effect. This prevents the nuclear dyes staining the nucleus. *Circled*: Typical of all (100% in this biopsy) dead cancer cells (grey smudges). *Squared*: Normal unharmed inflammatory cells. This was a deposit of prostatic cancer in the pelvis.

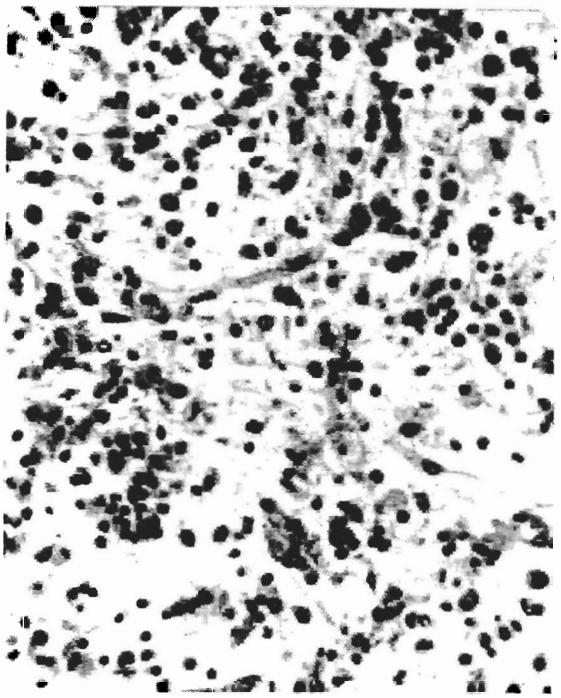


**Fig. 3** Biopsy taken 48 hours after Figure 2. All the heavily stained cells are normal inflammatory cells scavenging the dead cancer cells. All of these have been removed by this acute inflammatory reaction which in bone causes very acute pain for two or three days until it settles.

A characteristic appearance of a proportion of the dead cancer cells was that of a coagulated rim of cytoplasm surrounding an unstained nucleus. The appearance is that of a 'poached egg'. In cutting the sections for staining, it was observed that where a semi-coagulated microwaved cell was cut in two, the nuclear contents were so liquid that during fixation they were washed from the slide. The nucleus was definitely not coagulated. The coagulated ENCCs (extranuclear cell contents) proteins completely covering the nucleus prevented any fixative or staining dye entering the nucleus. Since the coagulation is limited to the ENCC then the $ER_{ex}$ units must be situated there. The site appears closely related to the mitochondria, some of which also appear to have been coagulated.

### DNA/RNA is the blueprint, not the cause of life

The genetic material only replicates when the cell is in mitosis. It is inanimate without energy from a power source. It does not spontaneously grow exponentially. To manufacture a genetic product requires the introduction of the genetic material for replication into an immortal

cell. The immortal cells from multiple myeloma cancer and non-spore-forming bacteria are commonly used in industry. This is categoric proof that the genes in the genetic material are not the power source of mitosis and therefore could only be the cause of cancer if they failed to control mitotic power sources.

### Reflected cancer spectra

434 MHz is unique in that it increases the exponential electrical production from the reaction 2GSH → GSSG, etc. which fluoresces. Figure 4 shows the reflected spectra derived from the author at any body site above the knees taken in 1976 and compared (Fig. 5) with that reflected from a cancer sufferer on the same day using the same equipment. All clinically detectable cancers in vivo irradiated with 434 ± 5 MHz electromagnetic radiation alter the reflected spectral distribution with an increased total intensity, resonance and fluorescence above the incident frequencies. All such effects disappear a few minutes after death of the host. Unless treatment is within a Faraday cage, these spectral changes can be analysed at any distance within the limits of detectable signal strength.

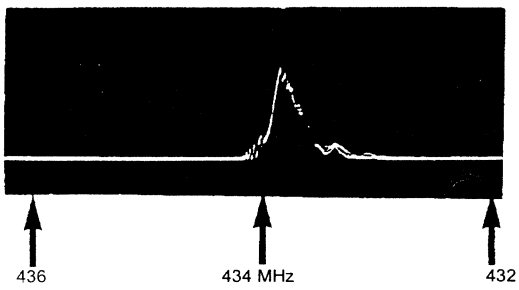



**Fig. 4** Reflections from a normal liver/upper abdomen.

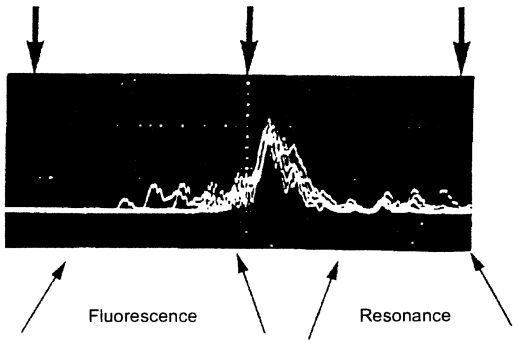



**Fig. 5** Reflections from a cancer sufferer with bowel cancer and multiple large liver secondary cancer. In each two dipole antennae with axes at 90° positioned on the upper abdomen were used. The spectrum analyser antenna was four metres from the dipoles but such a signal can be obtained at any distance within the analyser's sensitivity. The patient's cancer fluoresces and resonates. Exposures 1/8 second, 10 scans per exposure.

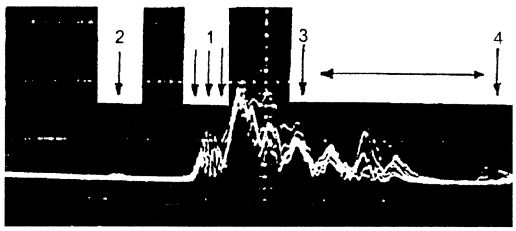



**Fig. 6** The reflected spectrum from a pelvis full of recurrent rectal cancer, irradiated with two folded dipole antennae energized at 400 watts, the central vertical scale is at 434.2 MHz, higher frequencies to the left, lower frequencies to the right. The calibration squares are 1 MHz per cm. One eighth second exposure: repetition rate of 50 sweeps per second. Arrow 1 indicates fluorescence. Arrow 2, a further fluorescence, arrow 3 down to 4 indicates resonance of the cancer.

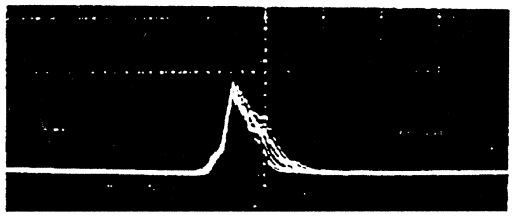


**Fig. 7** Without change in the radiated power, position of the antennae or patient 15 min after the injection of 15 g L-glyceraldehyde intravenously. A minor fluorescence is present at a slightly higher frequency than the peak. The resonance effect has disappeared. Approximately 45 min later, the pattern slowly returned to that of Figure 6.

Inhibition of anaerobic glycolysis with L-glyceraldehyde has been demonstrated by Baker (15) and Strickland (16). Figures 6 and 7 show how an intravenous injection of 15 g of L-glyceraldehyde during the exposure of a patient with massive secondary pelvic cancer from a rectal primary, abruptly changes the gross spectral pattern. The fluorescence disappears for approximately 30 minutes and then returns to its pre-injection display. Some very slight temporary cancer inhibition occurred as a result of this method. The patient obtained no lasting benefit and the conclusion drawn is that the cessation of anaerobic glycolysis by L-glyceraldehyde does not permanently injure $ER_{ex}$.

By contrast, Figure 8 shows the clinical history of a patient with recurrent bladder cancer and how he obtained complete control of his malignancy with injections of the disulphide agents cystine and oxidized glutathione before his microwave exposure. This patient is alive without cancer 12 years later when every other conventional method of treatment had failed him. The

Bladder cancer J.S. Male D.O.B. 20/3/31

| Date | Clinical state | Stage/TCC grade | Treatment |
|---|---|---|---|
| 1979 |  | T1 G2 | TUR and partial cystectomy |
| 1980 |  | | TUR |
| 1981 | | | TUR |
| | | | TUR |
| | | | TUR |
| 1982 |  | | TUR |
| 1983 |  | T1 G2 | I.V |
| | | | Oral |
| 1984 |  | T2 G2 | I-Vesical |
| | | | Cytotoxics |
| 1985 |  | T3 G2 | X.R.T 6200 rads in 35 doses |
| 1986 Feb 18-Mar 17 |  | T3 G2 | 12 Treatments: 2.0 gm cystine 1.1 gm GSSG 2 x 4 min UHF @ 1600 watts |
| | 9 Years ↓ | | |
| 1995 May 1 |  | | NIL. Bladder clear |

**Fig. 8** A patient who had proven cancer of the bladder, stage and grading as indicated. Partial cystectomy in 1979 was followed by multiple transurethral resections (TURs). In 1983, intravenous, oral and intravesical cytotoxics were given yet the disease progressed. In 1985 a full course of X-ray therapy was given. Between 18 February and 17 March 1986, 12 treatments of microwaves with the disulphides cystine and GSSG were given which has resulted in the bladder remaining clear to date. TCC denotes a transitional cell carcinoma of moderate growth rate, G2 in the scale 1 to 4. Stage T1 = confined to bladder lining, T2 = spread to tissue around the bladder and T3 = spread into abdominal wall scar, proven by biopsy. Professor J.S. is in excellent health, cancer-free at June 2000.

conclusion reached was that the immobilization of $ER_{ex}$ itself was absolutely essential to control the disease of cancer. The temporary prevention of anaerobic glycolysis does not destroy associated $ER_{ex}$ systems. The destruction of every $ER_{ex}$ in each cell is essential to cure the cancer. One year later, this patient's spectral reflections showed neither fluorescence or resonance.

### $ER_{ex}$ is the direct target of ionizing radiation

Ionizing radiation in all its forms is unique because it is the only method of cancer therapy which reduces a cancer colony in accordance with a negative exponential

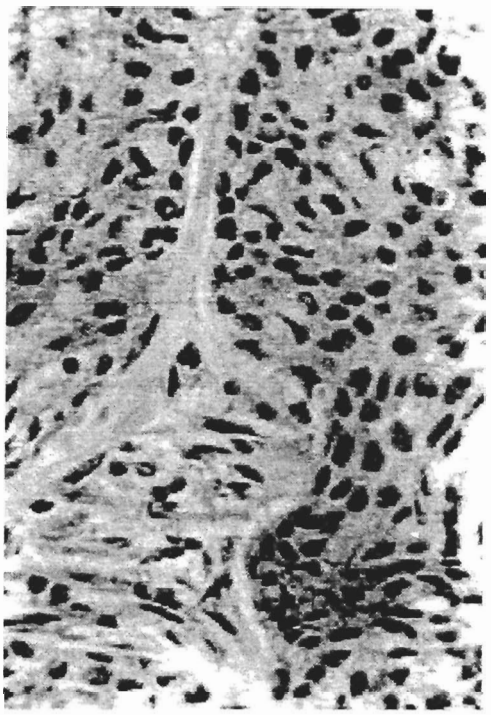


**Fig. 9** Biopsy at 9:00 a.m. of a cancerous 3-cm diameter breast ulcer, slowly growing for two years. Fewer than 5% are in active cellular division (mitosis).

equation (17). Because living growth obeys a unique positive exponential equation, then automatically $ER_{ex}$ must be the only primary target of ionizing radiation.

EMR will increase cancer's mitotic rate (Figs 9 & 10) when using frequencies of 8, 12, 27, 434, 915 and 2450 MHz in appropriate dosages. All EMR of any frequency also creates hyperthermia of cancer cells in accordance with Joines' measurements of their electrical conductivity but as far as is known only 434 ± 5 MHz creates fluorescence and/or resonance as well. Ionizing radiation (X-rays) followed by EMR of any frequency produces the effects of the same dose of X-ray therapy before or after non-electrical heating to 41.8°C. 434 MHz EMR followed within 20 minutes by ionizing radiation increases the cell kill by 100 to 150 times. Johnson et al. (18) have demonstrated experimentally a non-thermal radiosensitizing effect of 434 MHz. Because 434 MHz EMR increases the non-thermal X-ray kill, it must also specifically target $ER_{ex}$ but does not destroy exponentiality (Appendix 1 is a summary of clinical trials).

Figures 11 and 12 demonstrate that 434 MHz before X-ray therapy converts disaster to triumph! This malignant Schwannoma (Fig. 11), continued to grow during

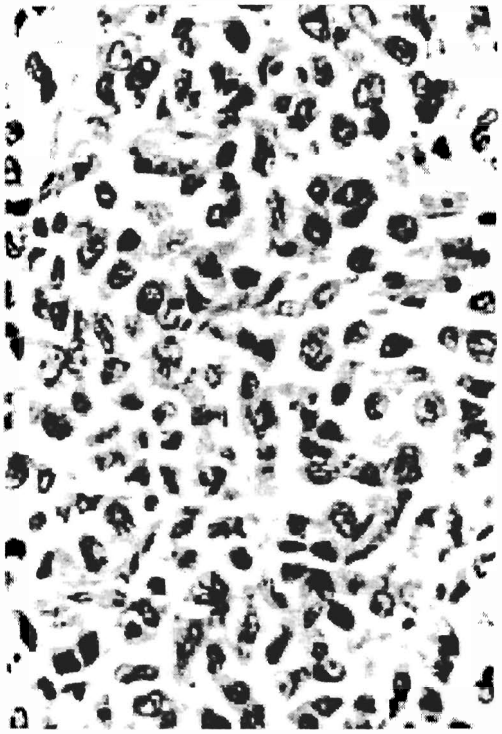


**Fig. 10** Between 9:30 a.m. and 10:00 a.m., the breast was irradiated with 434 MHz at a measured dose of 20 milliwatts per square cm, rested for 30 minutes and then re-irradiated for 30 minutes. This biopsy is four hours later and approximately 95% of the cells are in mitosis. The maximum cancer stimulation recorded is a malignant melanoma whose doubling time changed from 30 days to approximately 20 hours. 434 MHz UHF can stimulate the growth rates of all cancers and changes its growth equation from $N_e^{A_{(1+e^{-\alpha T})}}$ (Fig. 9) to $N_e^{AT}$ (Fig. 10) and selectively kills those which have apparently become nutritionally deprived as in bone marrow (Figs 2 & 3).

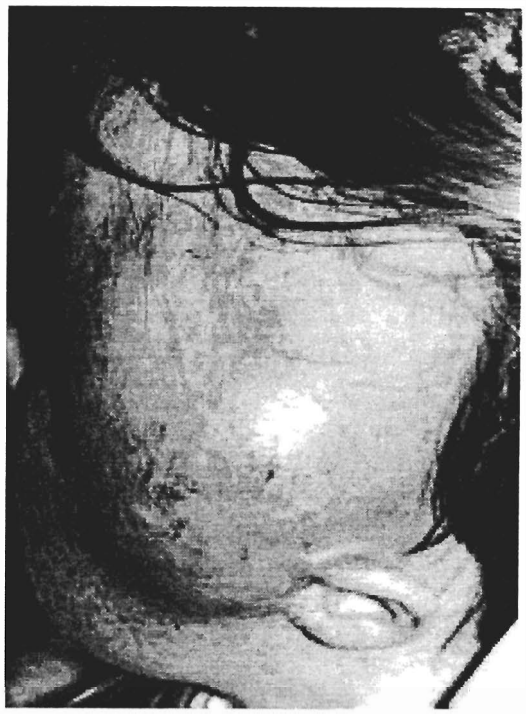


**Fig. 11** A Schwannoma (malignancy of nerve sheaths) in a 13-year-old one month after 23 doses of X-ray therapy (200 rads per day, total 4600 rads). It continued to grow.

and after conventional in air normothermic X-rays (as given in Melbourne, Victoria, Australia) totalling 23 doses of 200 rads each. This dose will kill five or at most six $ER_{ex}$ units per cell (19–21).

Figure 12 shows how 11 doses of 434 MHz (from equipment as in reference 14) followed by 11 doses of 150 rads each alternating with 11 doses of 150 rads each delivered without the UHF radiation completely eliminated this radioresistant malignancy. If x is unchanged $D_o$ becomes four or five rads! This is ridiculous because $ER_{ex}$ will not respond to anything less than between 90 and 95 rads (see caption for Figures 9 and 10 and Appendix 1 footnote) even after 434 MHz radiation. Therefore the radiosensitization of 434 MHz must have reduced the x number to one or approaching one (see Appendix 1 for results of treatment of skin cancers).

Calculations reveal that each cell in this Schwannoma contained 15 x (or $ER_{ex}$) units. Hence, before any therapy, each cell concealed at least 20 or 21 $ER_{ex}$ units which must be the unique value of x for this particular cancer in this particular 13-year-old patient. Ionizing radiation at a raised temperature kills in accordance with the equation (20,21)

$$N_R = N_o\left(1-\left[1-e^{-\frac{Z.D}{D_o}}\right]^X\right)^y \quad [1]$$

This equation of response has assumed that the x number of the cell is the total number of potentially active $ER_{ex}$ units per cell. It has furthermore assumed, according to van den Brenk's findings, that a minimum of two of the potentially active $ER_{ex}$ units are in fact active at any one time to power the cancer's mitosis. Therefore,

[1](where $N_o$ = initial tumour size, $N_R$ = residual tumour size after y doses of D rads; Z is the temperature factor, 1 at 38°C rising to 2.0 at 41.8°C; $D_o$ is the radiosensitivity value in rads and x is the number of targets per cell which must be killed for the cell to die). This equation applies to human cancer in a normobaric situation and Z is created by non-magnetic or non-electrically induced heating of any form.

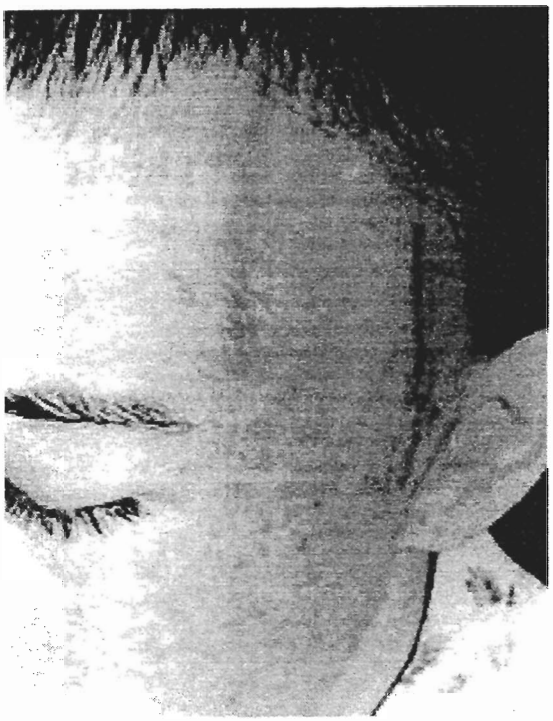


**Fig. 12** Three months after 22 doses of X-ray therapy (434 MHz followed by 150 rads on Monday/Wednesday/Fridays and 150 rads X-rays only on Thursdays and Fridays to 3300 rads total). The first ever response of this cancer reported in the literature. There was no recurrence one year later. Figures 2, 3, 9, 10, 11 and 12 are reproduced with the Editor's permission from The Cause of Cancer, *Med Hypotheses* 1979; 5: 109–144.

whilst 434 MHz heating has a minor radiosensitizing effect ($D_o$ reduced from 180 to 120 rads approximately) its non-thermal effect is to make more $ER_{ex}$ units active. The definition of x in this equation must therefore be 'the reciprocal of the proportion of $ER_{ex}$ units per cell which UHF activates and are exposed to X-ray therapy when active'. Therefore, if a cancer cell has 15 $ER_{ex}$ units and all are activated, x is the reciprocal of 15 divided by 15 or 1. If only six are activated then x is the reciprocal of 6/15 or 2.5. Even in such a situation a radioresistant cancer can become considerably sensitized.

The equation of ionizing radiation response of a cancer colony becomes

$$NR = N_o\left(1-\left[1-e^{-\frac{Z.D}{D_o}}\right]^{\frac{x}{V}}\right)^y$$

where x is the total (active and inactive) number of $ER_{ex}$ units per cell and V is the number of x units activated by

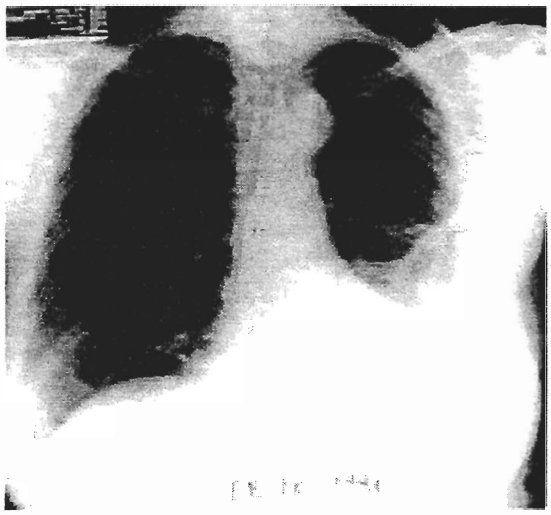


**Fig. 13** A patient on 11 February 1991 suffering from a left side mesothelioma, confirmed by biopsy. This X-ray is after her effusion had been drained and before her first treatment.

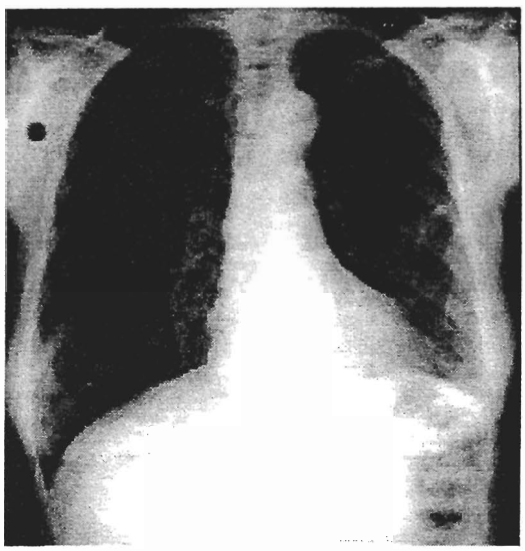


**Fig. 14** The end result on 3 May 2000 after using six courses of oxidized glutathione and cystine intravenously before 434 MHz microwaves in 1991 and early 1992. She remains in excellent health at June 2000. She is the only nine-year survival with apparent cure in the world's literature. Cystine and oxidized glutathione in an adequate concentration around her mesothelioma will kill $ER_{ex}$ when it is activated by fluorescing. From previous experience with over 100 patients treated by 434 MHz and ionizing radiation calculations indicate that each cell of such a cancer contains between 8 and 50 or more $ER_{ex}$ units in each cancer cell. All must be destroyed to cure the cancer.

434 MHz ± 5 MHz UHF immediately before dose D rads is delivered.

Figures 13 and 14 record the nine-year survival after elimination of a left-sided mesothelioma in 1991. She is the only known case in the world's literature, living nine years after diagnosis and apparently cured using glutathione and cystine intravenously before 434 MHz microwaves.

### Hyperbaric (3 atmospheres $O_2$ pressure) radiotherapy

X radiation in hyperbaric oxygen at three atmospheres was used to treat a series of 600 patients between 1968 and 1982 (22). Evaluation of the $ER_{ex}$ numbers in such responses (a five-year survival twice as good as conventional X-ray therapy) reveals that three atmospheres of absolute oxygen pressure does not alter the number x in the equation and therefore does not make $ER_{ex}$ more sensitive to ionizing radiation. The success of the method depends upon using six uniformly accurate doses of 600 rads throughout the tumour volume twice a week. Implanted sampling devices in the centres of tumour masses revealed a reduction in the glucose concentrations in the centres of big masses of tumours (the neck was the region chosen for these measurements) and that the hyperbaric oxygen is only effective if the patient is 'soaked' for at least 35 minutes before the radiation is commenced. By that time, the majority of the glucose in the centre of the malignancy has been metabolized. Part of the superior effect of hyperbaric radiotherapy is therefore also related to a reduction in the free glucose concentration in the malignancy itself.

### Anoxic radiotherapy

Van den Brenk (23) devised and perfected the treatment of limb tumours treated under a tourniquet creating anoxia in the limb containing a cancer which could be isolated from the general systemic circulation. This method was of great success in Victoria, Australia, where it was pioneered, but failed in some other centres and the method was largely abandoned because of the irregularity of its results.

Holt (22), after visiting several centres in the Northern Hemisphere which performed this treatment in winter, concluded that the dependent limb (after exclusion of the circulation) cooled and therefore the irradiation was less effective under these conditions. Treatment of a patient's limbs warmed by hot wax failed to improve the results but the application of a 50 Hz electric blanket transformed the method from a 50% failure to a 90% or better response. This is the proportion of young people who have avoided amputation after treatment in such manner. At that time, the electrical characteristics of $ER_{ex}$ were not known and it appears that it was not the rise in temperature of the isolated limb cancer which improved results but it was the 50 or 60 Hz electrical induction of energy in $ER_{ex}$ which made the uncontrolled $ER_{ex}$ systems in the cancer active before and whilst irradiation was carried out.

The majority of limbs so treated had no sequelae after total dosages of 10 000 rads had been delivered. Twenty-five years later, only slight fibrosis of some of the muscles was apparent. Normal stem cells which completely control their $ER_{ex}$ energy units will tolerate six individual daily dosages of at least 1900 rads (total 11 400 rads) and still retain function 20 or more years later. Van den Brenk's patients were also tried on higher single dosages and the limit of tolerance was approximately three successive daily dosages each of 2500 rads without long-term harm to the normal tissues. Woodward (24) has shown in vitro the extreme radioresistance of GSH and GSSG which tolerate dosages in excess of 10 000 rads without chemical decomposition.

Anoxia is the best radioprotective agent known which prevents damage of $ER_{ex}$ under very large doses of ionizing radiation. The near doubling of the control rate of cancer under anoxic limb therapy conditions by the induction of 50 Hz magnetic fields in the cancer suggests also that, even under completely anoxic conditions (as life started in the anoxic world), radiosensitivity varies with the activity of $ER_{ex}$ and explains its survival in a highly radioactive primitive earth. The intelligence of $ER_{ex}$ only permits intermittent activity to survive within the destructive X- or beta ray doses of a highly radioactive environment.

### Nucleoli – as important as genes?

Drummond's work (25) on the distinguishing characteristics of stem cells compared with normal adult non-stem cells and that of other workers proves that the ovum contains the nucleoli (up to 2000) which appear to be equally as essential as genes (26) whereas the sperm does not contain any nucleoli (27). Defects in the nucleoli are present in all cancer (28). Only stem cells and primitive cells which have the potential to undergo full development into adult stable cells can be the cells from which cancer commences. Drummond's work has established this conclusively. It is impossible to believe that cancer is created by adult stable cells because this would require a fixed cell to suddenly become de-differentiated when assuming cancer form. Embryology teaches us that $ER_{ex}$ powers cells until they become fully mature and differentiated. Cancer can only arise from a stem cell or fetal totipotent

cell because exponential mitosis must be powered by $ER_{ex}$ in the Pasteur reaction.

### Evolution

The suggestion is therefore made that, in the development of multicellular organisms, three features are essential:

1. Fertilization introduces $ER_{ex}$ into the ovum. The exponential growth power source uses anaerobic glycolysis and as development proceeds this is controlled in turn by GSSG concentration, then aerobic glycolysis, the citric acid cycle, the phosphogluconate cycle and finally by other influences such as the genetic information. Any break in this chain of control causes autonomy of $ER_{ex}$ (cancer) and therefore cytotoxic chemicals designed to destroy genes must be totally ill conceived. A few cytotoxic agents, e.g. cyclophosphamide, serendipitously also interfere with glycolysis. This may explain their therapeutic effects on cancer in vivo.
2. The nucleoli which may number several thousand in an ovum slowly disappear as differentiation proceeds to the adult cells. The suggested function of the nucleoli is the development of the specific physical characteristics of that particular developing organism (28). Agents such as thalidomide appear to attack nucleoli in preference to genes (which remain normal). This reinforces the view that nucleoli control the gross anatomical forms of life (29,30).
3. The genetic material is responsible for the specific soft tissue characteristics which then 'fill out' the organism by clothing the pre-arranged form (specified by the nucleoli) with flesh.

Modern pathology usually examines only dead stained sections in preference to in vivo vital staining and dark ground microscopy. This appears responsible for pathologists and geneticists believing that the genetic material alone is responsible for the ultimate formation of the new individual.

### The philosophy of exponential chemistry

Life is unique in growing exponentially. The first reaction which converts non-life to life must therefore be of exponential form and must also generate life's intelligence. Automatically, therefore, every aspect of life's growth survival, evolution and social progress must be considered in terms of exponential mathematics. Every activity of humans and every living organism is therefore expressible in terms of exponential or Gompertzian mathematics (1).

$$N/N_o = e^{AT} \quad \text{or} \quad N/N_o = e^{\frac{A}{\alpha}(1-e^{-\alpha T})}$$

Crocodiles are classic examples of the Gompertzian exponential equations which govern all living creatures. Crocodiles are physically unaltered in appearance over 230 millions of years without suffering any obvious evolutionary changes because their teeth, armoured hide, speed and cunning have eliminated rivals. Each social group of crocodiles is isolated yet homogeneous and of constant numbers (predators eat their eggs, crocodiles eat each other) and in the exponential equation which governs their life and death A and alpha are in perfect harmony and balance. Since in this equation T is infinite and the numbers at time T are the same as the numbers at time zero, then crocodile $e^{A/alpha}$ is one.

With long-range lethal weapons, crocodiles were killed simply because they were feared. Suddenly there is an increasing number of crocodiles in the wild of northern Australia because, by upsetting the natural balance (i.e. predators eating crocodiles' eggs, adults fighting with each other and younger crocodiles having insufficient food which formerly kept the numbers constant) A no longer balances alpha: A has risen, alpha has fallen, T is finite yet small and crocodiles become a plague.

The more crocodiles are killed, the quicker will their reproductive rate become. Today, they have to be culled to reduce the danger to humans. So the idiocy of man by upsetting an exponentially balanced situation must ultimately lead to destruction of all the crocodiles. A simple mathematical reduction of a Gompertzian growth situation can only succeed if an instantaneous total kill obtains. Humans cannot survive any more than dinosaurs unless they reduce A, increase alpha, make T large and reduce 'economic' growth to zero.

War (due to greed) is the classic example. Popular belief is that war reduces all population sizes. The huge baby boomer generations completely disprove this theory. Warfare automatically raises A to its maximum when all the sophistry of calm, educated orderly civilization spends its resources on munitions and alpha is zero. It converts $e^A/\alpha\ (1-e^{-\alpha T})$ to $e^{AT}$ until war ceases. The baby boomers generation appears as the result.

As cancer slowly overwhelms its host's energy sources so growth of $ER_{ex}$ changes from simple exponential to Gompertzian. In exactly the same way, a colony of rats and human populations expand by slowing their exponential growth to fill the space in which they live. All single cell life (viruses, fungi, etc.) and expanding small populations of humans in a rich environment are therefore equivalent to early cancer.

When two single-cell life units co-operate to form a multi-cell specialized unit with two functions the control of mitosis must be by joint agreement. Cancer is loss of

communal control of a single cell in a multicellular organism. Viruses, prions, fungi classify as cancer. The Gompertzian mathematics encompasses both ends of the spectrum of growth. Viruses with access to unlimited energy sources grow at a high simple exponential rate. Bacterial spores, dormant for years yet not dead, are at the other end of the Gompertzian scale where T is very large, A is very small and alpha is also large.

### Viruses – dead, alive or both?

Our ancestors always sited their fever hospitals downwind from the towns. They realized not only that smallpox virus was spread via the wind but the infective agent was difficult, if not impossible, to kill to prevent its spread.

Knowing that the power source for a virus is $ER_{ex}$, plus the definition of life, we now know that the virus is 'dead' when sailing on the wind and becomes 'alive' when its profile fits the receptors in any suitable living cell and it plugs itself into the host $ER_{ex}$ system.

In floating loose, the viral $ER_{ex}$ would be all in the oxidized state, GSSG, without the ability to stabilize any GSH. So it is dead.

When plugged in, the cell has anoxic areas which contain GSH. So $ER_{ex}$ becomes functional and it becomes alive. Risen from the dead.

Thus, HIV will only fluoresce under 434 MHz when it is in living cells.

We now have the explanation of my reported observation in 1979 that the fluorescence of cancer ceases within a minute or two of the death of the host.

### Intelligence based on an exponential chemical system

Life can only occur when the exponential reaction designated $ER_{ex}$ creates it and every succeeding control reaction of $ER_{ex}$ is of simple form. Physical evolution is thus pushed by $ER_{ex}$ and is Lamarckian and automatic. Any block to evolutionary progress will be overcome and chance Darwinian response can play little or no part in such a system. Every single unit of any life form is 'intelligent' because of its exponential creative reaction.

The energy for $ER_{ex}$ can only be used for cell division or mitosis and although the daughter cells may thus gain information which make them more intelligent than their parent cells there is no evidence that the intelligence of the brain acts by cellular division. Such a system cannot be seen biologically and therefore $ER_{ex}$ must be the basis of intelligence without mitosis.

The concentration of cystathionine in brain is greatest in man, less in the anthropoid apes, still less in rodents and extremely small in invertebrates. The starting point for the creation of cystathionine is methionine (31).

Ashford and Holmes (32) have shown that glial cells use anaerobic non-phosphorylating glycolysis as an energy source and therefore $ER_{ex}$ is active only in the adult glial cells. Neurones require oxygen and glucose, have a respiratory quotient of one and therefore rely solely on aerobic glycolysis. Neurones never ever become cancer. All brain cancer is from glial cells of some sort. Thus glial cells contain $ER_{ex}$ and it is active, whereas neurones do not contain this mechanism.

Assuming that the increasing levels of cystathionine in the brains of animals from invertebrates up to man is in proportion to the 'intelligence' of these organisms, then the conversion of methionine to cystathionine which has to be mediated by $ER_{ex}$ in the Pasteur reaction could only be present and performed in the glial cells.

Thus the foundations of brain intelligence from a uniquely 'exponential' chemical reaction is revealed. The conversion of methionine to cystathionine in exponential quantities proportional to time is the base repository of learning. This combined reaction has been called $CR_{ex}$ denoting a chemical exponential reaction based on $ER_{ex}$. $CR_{ex}$ must be controlled in a similar manner to $ER_{ex}$ in the Pasteur reaction but its mechanism is unknown.

The successive conversions of cystathionine to all other compounds in the brain must be non-exponential in form if this system is to provide intelligence. It would appear that the glial cells may well be active even during sleep. If so, then a permanently active electrically good conductor would continuously and selectively attract energy deposition from all stray electromagnetic wave pollution. This would explain the specifically increased incidence of glial cell cancer with increasing EMR pollution.

Failure of communal control of a somatic cell causes cancer. Failure of the communal control of a glial cell has two possibilities. Firstly, $ER_{ex}$ becomes autonomous and creates brain cancer or $CR_{ex}$ becomes autonomous and creates Alzheimer's disease.

### Cloning and human spare parts manufacture

$ER_{ex}$ is continuously active in some or all glial cells from energy produced by the most primitive energy source known – anaerobic, non-phosphorylating glycolysis. These cells are therefore the closest biochemically to early growing embryos. A supply by collection of these glial cells from biopsies of 'silent' brain areas might circumvent the problems of supply from fetal tissues.

### Exponentially growing non-cancer disease

In the practice of treating cancer patients, examples of multiple sclerosis, scleroderma, herpes zoster, hepatitis, amyotrophic lateral sclerosis, ankylosing spondylitis,

systemic lupus erythematosis, ulcerative colitis and others have been incidentally treated. Every patient has benefited and most have elimination of these diseases, except in ulcerative colitis where a 20-year recession was created in a patient treated in 1976 for an abdominal malignant lymphoma. In 2000, his lymphoma remains cured.

All these diseases have the reflected spectral characteristics of cancer and all progress exponentially. They all appear to be powered by $ER_{ex}$ and glycolytic blocking agents with 434 MHz therapy should be a curative possibility for all diseases of similar aetiology.

Alzheimer's disease appears as an uncontrolled product of $CR_{ex}$ in a similar manner to cancer being an uncontrolled product of $ER_{ex}$. The amyloid fragments of protein gather in exponentially increasing amounts until death occurs. A patient volunteered for treatment of her Alzheimer's disease using 434 MHz microwaves after intravenous injections of glucose-blocking agents (S-Methyl-L-Cysteine Sulphoxide) and a methionine analogue. DL-methionine DL-sulphoximine was the obvious choice. Fifteen days' treatment produced a dramatic improvement in the mental disease and one year later her mental state appears indistinguishable from normal. No other patient has volunteered but there is an equivalent disease (amyloid) of non-glial cells which has also responded excellently to this combined therapy.

Amyloidosis and Waldenstroem's macroglobulinaemia produce amyloid-like substances. In this range of diseases death occurs from exponential overgrowth of amyloid fragments or closely related polypeptides and proteins which include the immunoglobulin molecules.

Sufferers of Alzheimer's disease, amyloid and virus infections fluoresce at 434 MHz in an identical manner to cancer and suggest that, whilst $ER_{ex}$ is the basis of these diseases, the production of amyloid material indicates both $ER_{ex}$ and $CR_{ex}$ are active in the affected cells.

### Bacterial infections

Human bacterial infections which rapidly lose their response to antibiotics over a few days or weeks have used their 'intelligence' to outwit the antibiotics applied. The antibiotic resistance is maintained in further generations and must indicate an induced mutation which is genetically perpetuated. Cancer cells with autonomous $ER_{ex}$ systems respond similarly to change their chemotherapeutic sensitivities. Appendix 2 contains the details.

### HIV/AIDS therapy

A patient with HIV and acute lymphatic leukaemia was treated in 1994 with glycolytic blockers and UHF microwaves. Five years later, his leukaemia remains cured but in 1999 his remission eased and his HIV is progressing. He has been persuaded against microwaves and to try the latest anti-HIV drugs and is now dying.

A patient with seroconversion in 1988 progressed to AIDS in 1992 and had four courses of therapy over the next three years. His chart is shown in Appendix 3. He appears unequivocally cured of his infection. Various spectral reflections from him are demonstrated in this appendix.

### "Prion" disease

This has been the title applied by Prusenier to the active infective agent of the sheep disease called scrapie. The discovery of an infectious agent which can cause mad cow disease and similar animal diseases affecting the nervous system has been attributed to prions. Like Kuru, where livers are cannibalized, the transfer between generation and generation is slow but certain. Despite its slowness, there is little doubt about the exponential growth phenomena which these prions cause. Unless another pair of chemicals which produce energy in exponential quantities proportional to time have been discovered, then one must assume that the glutathione cycle $ER_{ex}$ is responsible for the energy for their growth. If this is so, then these should be eminently treatable by the same methods as are advocated here.

One patient in the terminal stages of Jakob–Creutzfeld disease had the spectrum of reflections of 434 MHz from his brain analysed. The spectra were similar to those from cancer and suggest that $ER_{ex}$ was the basis of prion energy.

### Interpretation of the Gompertzian mathematics of life

Untreated cancer kills the host. Therefore why do our politicians, financiers and believers in the theory that growth is essential for survival not see that the same equations govern a population of individuals as does cancer on a host? Continued, inevitable, unique growth of colonies of living organisms killing themselves. So does any society which adheres to the same mathematics. Laird's description of prolongating the life of terminal cancer sufferers by increasing alpha's effectiveness should be consulted to understand how the demise of life on earth in the near future might be postponed: it is nearly too late; inevitable if we ignore this relationship:

$$N/N_0 = e^{\frac{A}{\alpha}(1-e^{-\alpha T})} \qquad \text{(Laird. 1)}$$

### Physical "A" and "Alpha"

The symbol A, which represents the acceleration of growth rate of $ER_{ex}$ and $CR_{ex}$, fulfils different functions in

physical and mental evolution. A in $ER_{ex}$ (or physical A) will increase the pressure for evolution of the body which includes relevant inherited portion of the nerves, brain/central nervous system to conquer adverse physical conditions. Inherited somatic mutations can be created by feedback circuits as in antibiotic resistance (33). A in $CR_{ex}$ (or mental A) will create increase of complexity and sophistication of the brain's non-inherited mental functions. This causes the development of tools to assist $ER_{ex}$'s physical changes. When $CR_{ex}$ has developed thought functions (by 'mutations' a process identical to Lamarckian evolution of our bodies, yet neither genetically controlled or inherited) to invent, control and supervise actions by non-physical methods, then evolution due to $ER_{ex}$ will cease.

When $CR_{ex}$ can control destiny through machines and tools, physical A and physical alpha of $ER_{ex}$ become equal and $N/N_o$ will be one or less. Physical evolution is finished. Species elimination occurs when physical Alpha overpowers physical A – overcrowding, starvation, diseases, competition, etc. as seen in the recent loss of world species of fauna and flora.

### Mental "A" and "Alpha"

$CR_{ex}$ or the exponential increase in complexity of conversion from methionine to cystathionine in those brain areas where this reaction is possible has no natural mental Alpha to control it. The danger to sophisticated society is uncontrolled mental A: humans will use language to make tools, machines, etc. to force the obedience of others.

The symbol mental A is the creed of greed which can be supplied by technology, the power from the ill use of money and force, particularly using the development of wartime scientific discoveries for popular use.

Physical evolution is thus finally conquered by mental evolution which can terrorize the planet. Every failure of a civilization appears to have followed this path to destruction.

Aggregations of power from bigger and bigger corporate structures and converting the world to a global village enhance mental A without any foreseeable control from mental alpha. If mental A is to be stabilized, mental alpha can only be created by instilling ideals of behaviour into our children, which they probably exhibit for the rest of their lives.

### A proverb from antiquity

Give me a child for the first seven years and you may do what you like with him afterwards.

This reveals how our forefathers understood the human mind. They saw that perfection of ethical and moral traits does not occur naturally and therefore factor Alpha in Laird's Gompertz equation must be created to counterbalance the automatic exponential development of the mind at rate A.

The proverb should probably be interpreted as meaning that the developing mind will unselectively learn any subject offered. No automatic control which evolution uses to maintain the perfection of our physical bodies similarly oversees the mental perfection of our thoughts.

The proverb should be interpreted as the recognition years ago that, unless adequate control of mental development is added by education and/or coertion of some sort before the age of seven, moral perfection becomes impossible. The product is then a 'clever devil'!

Our 'leaders' must assume the onerous burden of behavioural/moral perfection, otherwise their subjects cannot have a model to educate them.

### Consciousness

Consciousness is merely the ability to express personal thoughts created in one's own mind to other persons whose mind has undergone similar development. Consciousness exists only through language.

If the exponential complexity of the mind which creates language did not occur from lack of $CR_{ex}$, the perfection of our physical bodies and senses would not be affected. We would be like dumb animals. Our central nervous system would give us information from hearing, taste, touch etc. and the inherited reflexes would attempt to keep us out of danger. Without language to communicate there is no consciousness. One can define consciousness as the exponential mutation of that part of the brain which is not under genetic control without which no intelligent communication by speech is possible.

To solve the problem of cancer one has to define its three basic properties. This definition can only be achieved if the speech-sensitive portions of our brains have a language which will encompass the ideas we have to convey. Furthermore, the language must be used with as near-perfect syntax as possible, otherwise the receiving educated exponential system cannot understand the ideas and answer appropriately. New ideas would automatically be produced in an exponential system derived from adequate basic information (not subject to other prior processing efforts) judiciously combined with appropriate experimentation.

In $CR_{ex}$ the electron production is used to produce exponential quantities of a chemical compound which is the basis of intelligence, speech and thus consciousness. There is no natural intellectual control of this reaction so the potential for stray electromagnetic radiation to harm the system is much greater.

What is the result of overstressing the normal $CR_{ex}$ system? Glial cell cancer, Alzheimer's disease or simple failure to develop the exponential intellectual faculties to their full potential? We shall know within a generation or two from glial cell responses to exponentially increasing electromagnetic radiation pollution.

### Suppression of consciousness

The classic human examples of this occurred when the UK assisted the starving Indian people with a gift of bulk grain at the end of World War II. Unknown to either donor or recipient, the grain was spoilt. This ingested spoilt food resulted in a syndrome of hysteria, loss of speech, ability to think or communicate and hallucinations of 'blackness', 'death' and feral behaviour.

Recovery in the majority restored their brain function but most were certain that they had died and been 'resurrected'. Mellanby (35,36) and Bentley (37) discovered the toxic factor to be methionine sulphoximine, a product of methionine in the spoilt grain created by the action of an insecticide called nitrogen trichloride.

DL-methionine DL-sulphoximine was used as an additional glycolytic blocking agent in treating some patients with glial cancer. Single doses in excess of 2 mg per kilo in females and 5 mg per kilo in males created similar symptoms some hours later.

Immediate recovery from a state of apparent 'unconsciousness' whilst remaining able to function physically apparently relatively normally was by simple administration of methionine orally or intravenously. All patients who experienced these symptoms thought that they had died and recovered.

Despite the excellent results obtained using this compound, it was abandoned for cancer therapy. Methionine sulphoximine presumably prevents $CR_{ex}$ from using the exponential production of electrons in $ER_{ex}$ to convert methionine into cystathionine. This appears a pointer to the site of creation of consciousness. Methionine sulphoximine is probably the compound of primary choice to treat Alzheimer's disease.

### Life in another solar system

So far as is known, this reaction is unique on Earth and only $2GSH \rightarrow GSSG + 2e^-$ and $GSSG + e \rightarrow 2GSH$ has been discovered. No doubt if in a universe another reaction of pure exponential form is discovered which created 'life' then different 'living organisms' would exist apart from 'earthlings'. 'Starlings' would automatically evolve to survive on star world just like all life on earth and would certainly be totally different in physical form but have identical ability to adapt to star world environment. Evolution there would also be Lamarckian. 'Starlings' would also exhibit intelligence corresponding to the physical conditions under which their life exists. It is problematical and a moot point for discussion as to the possible paths that 'starling' intelligence based on a different reaction would take. It would appear most likely that the intelligence being dependent uniquely upon a mathematical expression would have the same attributes anywhere in the universe. The question would be, Is any conversation possible between intelligent species based on different chemical processes yet governed by the same mathematical functions? The search for extraterrestrial life will only be proven by the discovery elsewhere of a chemical 'exponential' reaction which would also be a directly interacting target for ionizing radiation. On earth, it is based on the sulphur in cysteine/cystine so perhaps some other polyvalent atom may trigger a Starling rival.

## RÉSUMÉ OF CONTENTS

1. Life is created by a cyclic reaction which produces energy in exponential quantities proportional to time, is irreversible and can transfer such characteristics from generation to generation.
2. Cysteine (-SH-) is the basis of life: $e^- + SS \rightarrow 2SH$; $2SH \rightarrow SS + 2e^-$. This energy can only be used for reproduction. Cystine (-S-S-) is insoluble in water and this reaction is solubilized in nature using glycine and glutamine to form glutathione (GSH and GSSG), ($e^- + GSSG \rightarrow 2GSH \rightarrow GSSG + 2e^-$: called $ER_{ex}$).
3. The energy for this cycle to be thermodynamically stable is possible either from beta particles or anaerobic glycolysis in which D-glucose is transformed into L-lactic acid.
4. Cancer is uncontrolled $ER_{ex}$: this can be activated by any non-ionizing EMR from 1 Hz to high Giga Hertz radiation. Alzheimer's and amyloid disease is uncontrolled $CR_{ex}$ and can be similarly activated. Viruses, bacteria, prions, etc. and all other diseases which progress exponentially must have $ER_{ex}$ as their basis, forcing their increase in pathogenicity, mutations and interspecies transference under increasing EMR pollution.
5. Methionine is the basis of intelligence. In the glial cells, $ER_{ex}$ converts methionine in exponential quantities to form cystathionine by a reaction called $CR_{ex}$.
6. Intelligence, like life, must be a chain of simple reactions in which the first or driving item is exponential in form. Hence $CR_{ex}$, which creates our intelligence, must be in the glial cells because neurones do not become cancerous and therefore cannot have intellectual $CR_{ex}$ functions.
7. Neurones are therefore solely a distribution mechanism which does not carry information by electrical means. The glial cells are the electrically

influenced cells in the central nervous system. If neurones carried information by electric currents, then by Faraday's laws of electromagnetic induction, a walk through the Earth's magnetic field would produce some sensation which could be interpreted.

8. Males can be sterilized by EMR, hence sperm contains $ER_{ex}$. Females cannot be sterilized by EMR therefore they do not contain $ER_{ex}$ but do contain all the nucleoli. Hence the need for the sexes.
9. It is impossible to visualize any binary-based computer ever simulating human mental processing. Until every computer input circuit processes information exponentially artificial intelligence of human standard is a computerized impossibility.
10. Consciousness is created by language between identically created exponential brain complexity in members of a similar species. The perfection of language expression by word meanings and syntax governs the level of intellectual capacity. Without exponential growth of chemical complexity of the relevant glial cells arising from human tuition and example there is no rapport between humans. Consciousness is unrelated to our appreciation of the earth by our physical senses.

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**APPENDIX 1**

| | Conditions of growth and/or therapy | | | |
|---|---|---|---|---|
| | Spontaneous human skin cancer treated by conventional normothermic X-rays | Spontaneous human skin cancer exposed to 434 MHz | | Spontaneous human skin cancer exposed to non-electrical heat before or after X-ray therapy |
| | | Before X-ray therapy | After X-ray therapy | |
| Observed growth | $N_T = N_O e^{\frac{A(1-e^{-\alpha T})}{\alpha}}$ | $N_T = N_O e^{AT}$ | Not mesured | Not measured |
| Treatment response | $N_R = N_O\,(1-(1-e^{\frac{-D}{D_O}})^x)^y$ | $N_R = N_O\, e^{-\frac{D.Y}{D_O}}$ | $N_R = N_O(1-\left[1-e^{-\frac{Z.D}{D_O}}\right]^x)y$ | $N_R = N_O(1-\left[1-e^{-\frac{Z.D}{D_O}}\right]^x)y$ |
| Value of Z<br>Value of x | 1<br>2.0 to 8.0 | 1.5 to 2.0<br>1 | 1.5 to 2.0<br>2.0 to 8.0 | 1.0 to 2.0<br>2.0 to 8.0 |
| Total X-ray dose | 3400 to 4200 rads | 2800 to 3600 rads | 2800 to 3600 rads | 3800 to 4200 rads |
| Clinical effects on the cancer | 47 failures in 300 patients<br>100% Moderate to severe skin reactions with some morbidity | 2 failures in 600 patients<br>No morbidity: 10% with moderate skin reactions | 5 failures in 5 patients<br>All retreated successfully but increased morbidity | 5 failures in 32 patients<br>Increased skin reactions and morbidity compared with isolated X-ray therapy |

Squamous cell skin cancer

937 patients treated by various regimes. Simple heating by non-electrical induction methods does not alter the activities/inactivity of the x units. Only 434 ± 5 MHz makes all x units active so that all are simultaneously sensitive and killed by X-ray therapy. This effect only lasts 15 to 20 minutes and MUST precede the X-rays and is the only possible choice for the most successful method.

The relationship between the proportion of a cancer colony killed by ionizing radiation therapy and the given dose is described by the exponential equation

$$N_R = N_0(1-(1-e^{-\frac{D}{D_0}}x)y \qquad (17)$$

where $N_R$ cells survive from $N_0$ subjected to D rads over y daily doses. $D_0$ and x are constants for each particular cancer (17). The synchronous addition of non-ionizing radiation at 434 MHz (ultra high frequency or UHF) to the dose of ionizing radiation (X-ray therapy or XRT of D rads) reduces the value of x to 1 and the equation which decribes treatment responses measured after 434 MHz radiation is:

$$N_R = N_o e - \frac{Dy}{Do}$$

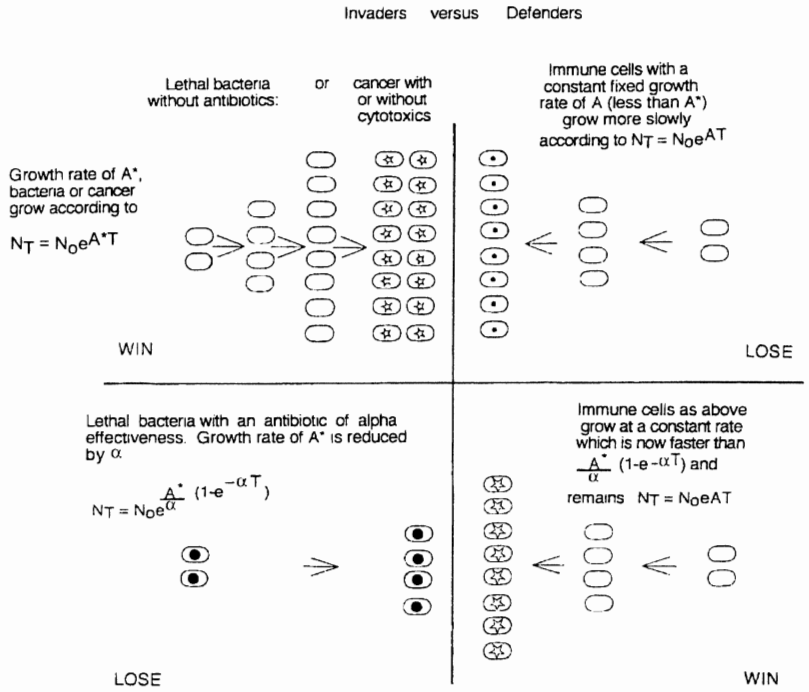
434 MHz before X-ray therapy in squamous cell skin cancers whose temperature did not exceed 39.5°C can reduce the $D_0$ value to a minimum of between 90 and 100 rads per application.

Where $N_0$ = initial tumour size, $N_R$ = residual tumour size after daily y doses of D rads; Z is the temperature factor, 1 at 38° rising to 2.0 at 41.8°C; $D_0$ is the radiosensitivity value in rads and x is the number of targets per cell which must be killed for the cell to die. A is the growth rate, alpha the deceleration of normal growth rate and T is the time between $N_0$ and $N_T$.

All information is processed exponentially into knowledge and stored chemically. EVERY response, internal (immunity, etc.) or external (speech, action, etc.) will follow exponential mathematical laws. Non-exponential

## APPENDIX 2

### Infection warfare

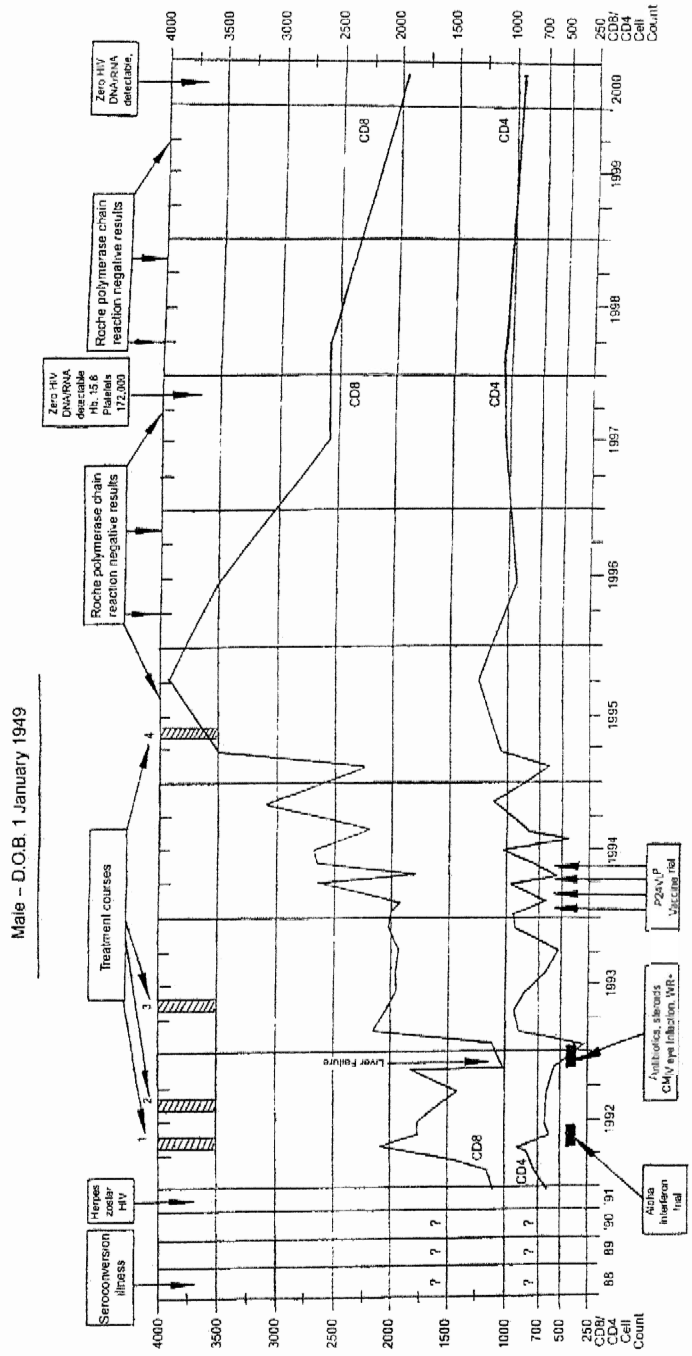



(e.g. binary) mathematics does not explain any living process. Binary computers will never ever simulate life.

It is popularly assumed that the antibacterial drugs available directly kill the invading organisms. Drummond (25) has shown that the immune defence system grows at an exponential rate which is constant for each type of immune cell (confirmed by personal communication). Therefore an antibiotic need only reduce the growth rate of the invading organism to less than that of the natural immune growth rate for the infection to be killed. Wherever acquired resistance to an antibiotic occurs must be because the antibiotic does not act upon $ER_{ex}$. This includes all antibiotics known under the generic heading of 'bacterio-static'. The direct lethal killing of bacteria (a 'bactericidal' effect) can only be due to a direct killing of $ER_{ex}$. Such dual action is present in Streptomycin as one of the aminoglycoside group of antibiotics. The chemical formulae of the aminoglycosides all contain hexose sugar rings. If these replace glucose in anaerobic glycolysis it would lead to a direct bactericidal mechanism. Whilst the gross clinical form of cancer is created by the host's 'immunity' (33) cancer is never killed by any known immune system in its host. Without an exponentially growing immune system which targets cancer's exponential growth then any treatment of cancer using the 'equivalent' of antibiotics is automatically guaranteed to fail. Antibiotic resistant invaders must increase their numbers exponentially. Cytotoxic chemotherapy can only be effective if it directly targets anaerobic glycolysis or an uncontrolled (cancerous) glutathione cycle.

A patient referred with AIDS in April 1992 for microwave therapy in conjunction with interferon. 7 treatments given – MW only, 8 to 16 April 1992. As predicted this reduced his CD4 count and his secondary infections were life threatening. Retreated with glycolytic blocking agents for 15 treatments 28 July to 14 August 1992. Antibiotics and steroids and infection precipitated liver failure and a further 15 treatments 5 March to 2 April 1993 were given. Immediate elevation of CD4 and CD8 cells occurred and after a fourth 15 day course 18 April to 5 May 1995 his CD8 count peaked at 3900 and CD4 at 1480. His PCR since has been negative and his CD8 count steady

**APPENDIX 3**



around 2500 and CD4 just over 1000. All haematology is normal and he has been physically normal for 5 years. In 2000 his HIV test is positive and HIV DNA/RNA is just detectable but cannot be amplified by the Polymerase Chain Reaction. His condition is therefore as expected of any patient who is cured of a viral disease. After surviving measles, mumps, chicken pox etc. the viral DNA/RNA fragments always remain and are detectable and they cannot replicate. The PCR can only amplify DNA/RNA if it is associated with its exponential energy source because genetic material in isolation is absolutely inert. This is categoric proof that glycolytic blockage whilst 434 MHz forces the glutathione cycle to fluorescent activity in the HIV virus kills the exponential viral energy source. This treatment, unlike vaccines which can only ever be manufactured when nature has demonstrated some natural immunity is created in the host (in this case, man, which is never responsive to HIV antigens), will be effective for all mutations of HIV and every other disease in which the exponential glutathione energy cycle is its source of energy to survive. It appears point less to engage in research on inert genes in expectation of curing an expanding disease which obeys exponential mathematical growth.

Below is an example of the spectrum reflected of the HIV patient in Appendix 3. The final day of treatment on 2 April 1993 shows an almost normal spectrum and shortly thereafter his viral load was measured at zero.

PH - Male - D.O.B. 1 January 1949

HIV Positive