Fever as therapy and Hyperthermia in the scope of whole-body-hyperthermia in the range of extrem temperature level (42° C /107,6 F) for the treatment of Lyme disease and Cancer

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Professor and Head of Department of Fevertherapy, Hyperthermia and sCMT Alpstein Clinic AG, Gais, Swizerland

Former founder of special international Hyperthermia center gisunt®, they used the chanes of combination from fever an different forms of hyperthermia

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Structure/ Overview

- **Introduction / General Information / History**
- Equipment technology
- Diseases and scientific background especially for treatment of Lyme and Cancer

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Hyperthermia = Treatment through Overheating

Local, regional, **WBH**, hyperthermia of body cavity (lung, abdomen and bladder), hyperthermia on the surface and in the depth, perfusionhyperthermia

„First, you know, a new theory is attacked as absurd;
then it is admitted to be true, but obvious and insignificant;
finally it is seen to be so important
that its adversaries claim that they themselves discovered it."
William James 1842-1910 – american psychologist and philosopher

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Historical milestones in hyperthermia I

- 2400 B.C. egyptian civilisation: healing effect of heat on breast cancer [Surgical Papyrus Edwin Smith]
- **540-480 B.C. Parmenides „give me the power to create fever and I will cure any disease"**
- **450 B.C. Hippokrates „Those who cannot heal diseases with medicine, should perform surgery. What cannot be cured through performing surgery should be treated with heat. Who cannot be healed with heat, is lost."**
- **1866-1887** Busch/Fehleisen/Bruns: **Remission of cancer with** septic **fever** for days: Infection applied as healing process
- **1894 Coley**: no longer infection, but **fever** (bacterial lysates) to influence the disease
- **1917 von Jauregg healed** invalids who where wasting away due to progressive paralysis **after infection from spirochetes (Treponema pallidum by Lues/Syphilis)** with plasmodia of Malaria tertiana, so with **fever** - **Lyme:** causa are also **spirochetes**
- **1918 Rohdenburg 302 reports** of histological saved malignacies with **remission** behaviour **after septic temperatures** in consequence of, among others, malaria, pox, erysipelas

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Historical milestones in hyperthermia II

- 1924 Warburg found aerobe glykolysis of tumour cells
- 1929 Kahler: incandescent bulbs with short-wave infrared radiation
- 1937 Kettering-hyperthermia through warm and humid air
- 1948 Lampert: exogenous energie input
- **1965 von Ardenne und Kirsch: WBH up to 44° C about 60 minutes, two chamber waterbath**
- **1965 release of the princip of sCMT by von Ardenne** at the Heidelberger cancer research institute
- **1968 von Ardenne: proof of a thermal sensitisation of cancer-cells**
- 1966 von Ardenne: machine for extreme perfusion-/ regional hyperthermia
- 1971 Heckel: infrared with diffuse reflexion dispersion
- **1975 Schmidt, K.L.: Fever and hyperthermia in non-oncological domain**
- 1975 von Ardenne: Selectotherm (27-MHz-high-frequency-hyperthermia for regional and whole-body-heating)
- 1977 Pettigrew: exogenous energie input (wax)

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Historical milestones in hyperthermia III

- 1985 Braun: infrared lokal
- 1985 von Ardenne/Meffert: water filtered infrared-a-radiation
- 1985 Hajto: hyperthermia and killercells
- 1987 Schmidt: hyperthermia and autoimmune diseases
- **1992 Hellige: absorption of infrared-a-radiation**
- 1989/93 Scherf/Meffert: infrared-a-hyperthermia at hypertonia and systemic scleroderma
- 1995 Meyn: infrared-a-hyperthermia for detoxification
- **1996 Vaupel: tumour-growth-inhibition by induced hyperglycaemia** and local hyperthermia
- **1996 Reisinger: preclinical data to kill Borrelias with temperature 39° C/ 102,2 F; 41° C/ 105,8 F and the most resitent typs with 42,0° C/ 107,6 F**
- 2007: Brockow/Wagner: infrared-a-WBH and fibromyalgia
- 2007 Milani: heat shock proteins, immunological competence

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Hyperthermia = Progress of increasing temperature over the setpoint

Active hyperthermia = Fever,
which is generated artificially
Passive hyperthermia = Process of increasing temperature
inside the human body through energy input from the outside

Both together offer the best chances for successful prognosis improvement in Lyme and cancer

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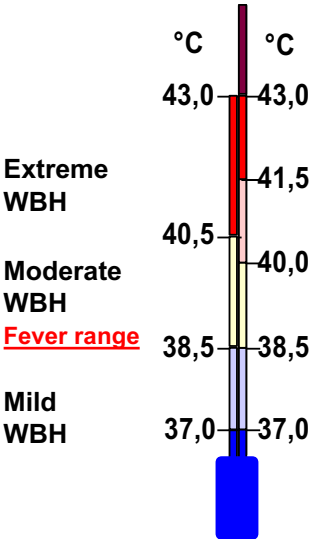
Temperature classification by the example of WBH



Extreme WBH 106,7 to 109,4 F today to max. 108,5 F
Direct cell killing with **increasing of sensitivity** from **41,5°C, without from 42.0°C / 106,7 to over 107,6 F**

Intermediate WBH 104,0 to 106,7 F
Synergetic-additiv efficiency of hyperthermal applied cytostatics

Moderate WBH 101,3 to 104,0 F
Activates immune response, stimulates immune system

Subclinical WBH 98,6 to 101,3 F
Vasodilation, increase of blood circulation, thereby support of treatment

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The most important effects of heat energy in the tissue

- Heating through excitation of molecular natural vibration
- Vasodilation and increase of blood circulation through local mediators and increased receptor activity
- Relaxation of plain and striated musculature through reflectory detonisation to reduce additional metabolic warmth
- Enlarged dilatability of fascia structures – analgetic effect on painful shrinking tissue
- Relief of pain / Inflammation inhibition
- Microcirculation increases through raise of the flow rate of erythrocytes and reduction of plasma viscosity
- **Oxygen partial pressure increases due to the blood circulation with up to 600% higher pO_2 towards baseline value**

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More effects of hyperthermia

- Potentiation of the effects on the interferon especially the antiprolifertive effect of IFN-γ and tumour necrosis factor (TNF-a)
- Potentiation of the effects is considerable: for Cisplatin 3-4 decimal power at temperatures of 42-43° C
- Intracellular increase of reaction rate, membrane destabilisation, Change of fluidity and transport properties
- Especially the membranes of the endoplasmatic reticulum are very thermosensitive –they can have an important function at the thermic cell death

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More effects of hyperthermia

- proved: Inhibition of DNA-, RNA- and protein biosynthesis
- proved: Induction of heat shock protein (HSP 27 / 70 / 90)
- release of immune processes, antigen presentation
- Support of apoptosis (cellprogramm will be stimulated)
- Sensitizer-effect starting at 41° C

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Fever/Hyperthermia - clinical rationale

Therapy	Target	Diseases
Active fever-therapy	Release/support of immune response	- General debility - Immunodeficiency - Susceptibility to infection - Detoxication - Autoimmune diseases (Colitis, Rheumatism, Psoriasis) - Cancer - Emotional disturbances
Mild/moderate hyperthermia	As stated above and expediting/ catalysis of metabolic processes	- As stated above - Borreliosis - Pain, fibromyalgia - Hypertonia - Lipometabolism disorders - Virus infection (Hepatitis, HIV, herpes)

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Fever/Hyperthermia - clinical rationale

Therapy	Target	Diseases
Depends on tube assembly	Influence on dermis, vitamin D – metabolism, bones	- Neurodermatitis, Psoriasis - Raynaud-syndrome - Sclerodermia, Eczemas
Extreme WBH/ sCMT	Tumorcell-destruction, immunsuppression, bactericidal effect, virus killing	- cancer - Autoimmune diseases - Borreliosis - Virus infection (f.e. HIV)

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Structure/ Overview

- Introduction / General Information / History
- **Equipment technology**
- Diseases and scientific background

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Infrared-surface-WBH

There are good therapy possibilities for the local heat supply, especially for chronic diseases. Water filtered A-rays induce practically no dermic exposure, but invade deep.
Thermic limits: There is almost always healthy tissue in the radiation field.

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Clinical indications for local hyperthermia with infrared a-radiation

- musculoskeletal disorders, e.g. muscle tension, tendopathies, degenerative spine- and joint variances
- Chronic inflammatory processes, e.g. abscesses, asthmoide afflictions, bronchitiden, bursopathies, chronic prostatitis, furunkulosis, sinusitis, periarthritis humero scapularis
- collagenoses, e.g. Scleroderma
- Chronic wound healing disorder, e.g. chronic venous Ulcus cruris
- Oncologic diseases, e.g. melanoma. With synergistic effects of heat supply with cytostatics/radiotherapy, more therapeutic options are available

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Regional deep hyperthermia

EHY 2000, HOT Oncotherm GmbH
Frequency: 13,56 MHz

Celsius CTS, Clesius 42+ GmbH
Frequency: 13,56 MHz

Thermotron RF-8, Yamamoto Vinita Inc.
Frequency: 8 MHz

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WBH

- Up to 43.5° C/ 110,3 F possible//41.8-42.5° C/ 107,2-108,5 F as the extreme type **our target 42° C- 42,5° C/ 107,6 to 108,5 F**
- or up to 40,5° C/ 104,9 F as the moderate type
- Tumour destructive or immunologic purpose
- Homogeneous temperature distribution
- Useful at the stage of macro- and micro metastasis
- To kill Bacterias and typs of viruses
- Reliable handling of different systems
- **Infrared-a currently approves as the optimal energy source**

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Whole-body-hyperthermia

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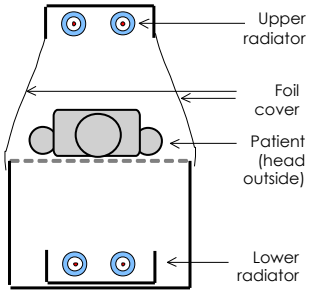
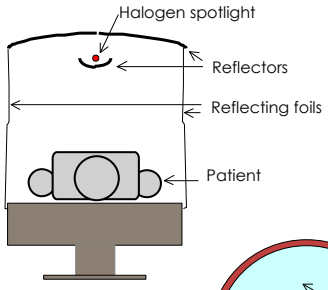
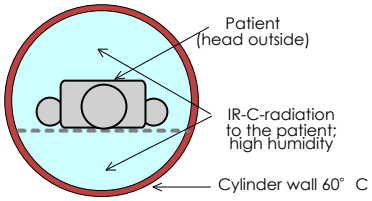


infrared-A
(machine: IRATHERM)



Infrared-B + C
(machine: Heckel-Bett)
New generation also infrared-A



Infrared-c
(machines: Aquatherm, Enthermics)

Further methods:

extracorporeal blood heating
(application unusual, high complication potencial)
Heat with contact, e.g. waterbath, Heatheal

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Why infrared-a for local and WBH?

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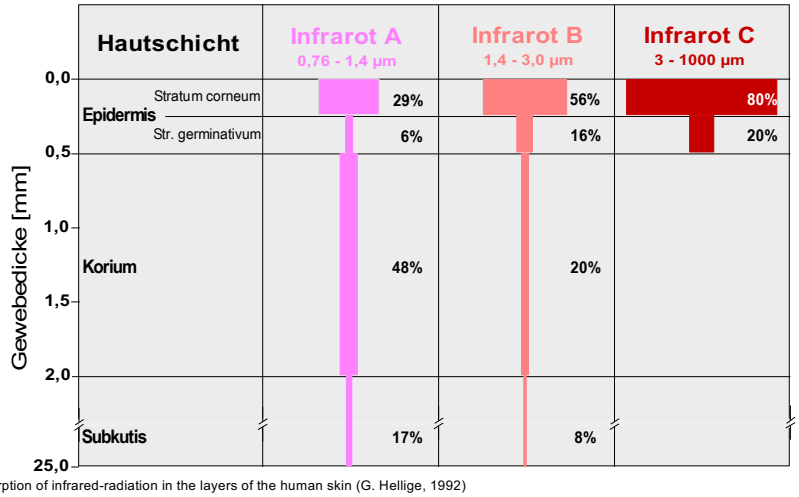

Absorption of infrared-radiation in the layers of the human skin (G. Hellige, 1992)

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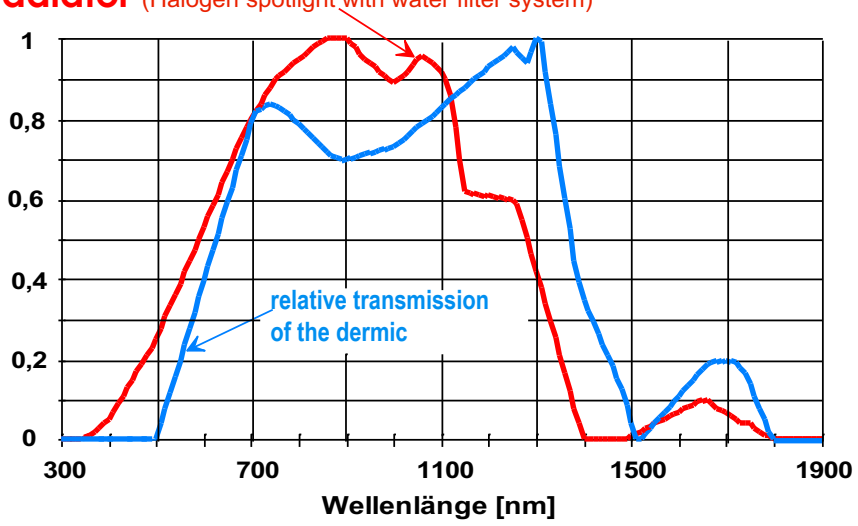
Relative spectral ray density of the IRATHERM-radiator (Halogen spotlight with water filter system)



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WBH

Energy transmission preferably with infrared-radiation, short-wave (infrared-A, IRATHERM), milde section (B, HECKEL) or long-wave (C, AQUATHERM). The heat will spread with the blood in the body, thereby increase of the core body temperature. Steering through radiator power.

Typical application

- **oncological:** **Cancer:** Hyperthermia in extreme section (+Hyperglycaemia and –oxaemia) if necessary combined with chemo- or radiator-therapy. In the intermediary section preferably as combination. Moderate hyperthermia for immuno-stimulation.
- **Non-oncological:** moderate section; treatment of chronic diseases (**Lyme**, painful situations, rheumatism, inflammations, tensions, neuralgia, scleroderma, Morbus Bechterew, fibromyalgia-syndrome, hypertonia, asthma etc.)

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WBH-machine IRATHERM 2000

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Structure/ Overview

- Introduction / General Information / History
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- **Diseases and scientific background**

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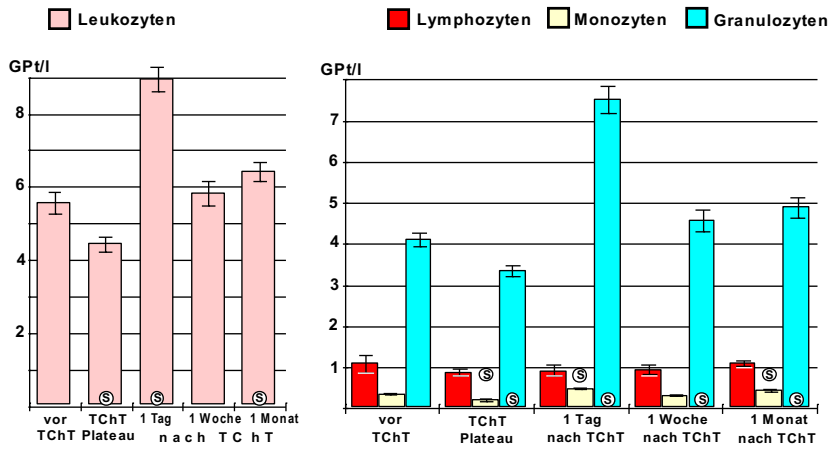
Change of leucocytes as well as lympho-, mono- and granulocytes in the temporal periphery of the thermochemotherapy



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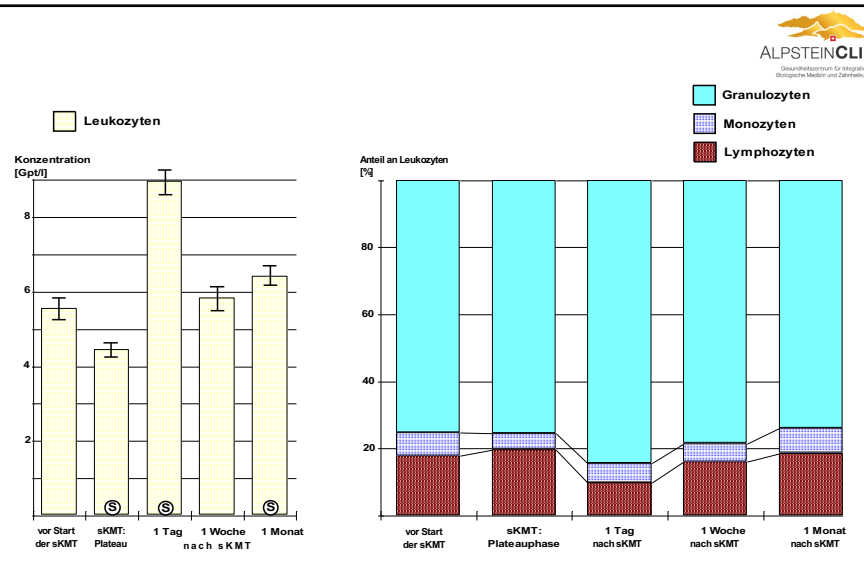

Statistischer Hinweis: Die mit "S" markieren Werte unterscheiden sich zumindest signifikant vom Wert zur Messzeit "vor Start der sKMT" ($p \leq 0,05$; T-test für abhängige Stichproben, n = 108; berechnet mit Hilfe des Programms SPSS 6.1)

06 / 00

Konzentrationsänderung der Leukozyten sowie der Granulo-, Mono- und Lymphozyten im Zeitbereich vor, während und nach Ganzkörperhyperthermie

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- Diseases, which increase environmentally associated or appear more intense, that can be treated with hyperthermia: Part I

- **Asthma bronchiale**
  - G. Zaltenbach (EHK 2/98): Repeated mild to moderate whole body hyperthermia under oxygenation
  - H. Wehner (NHK 5/13, S.11-13): Extreme whole body hyperthermia (Heatheal-Method)
- **Metabolism of ammonia und glutamine**
  - S. Jacob (Metabolism. Vol. 38. No 8. Suppl.1 1989 pp43-46: Hyperthermia was associated with a mild alkalosis, all acid-base parameters returned to basal levels 2 h after Hyperthermia
- **Detoxication**
  - Th. Meyn (10. Internationales Symposium für Umweltmedizin, Bad Emstal 09/95): Infrared-A-Hyperthermia for Detoxication
  - R. Kleef (Review Article, Springer Loseblatt System NHV,3/2006)

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- Part II

- **Hypertension/ Scleroderma**
  - Meffert/ Scherf (Akt. Dermatol. 19. Jhrg. Juni 1993 S. 141-172 u. Dermatolog. Monatsschrift 175 (1989) 733-7409: Alleviation through mild infrared-A-hyperthermia as a self-treatment
- **Fibromyalgia**
  - Brockow / Wagner (Clinical Journal of Pain, Volume 23, No. 1 2007): Open, randomised, controlled Study, exz. Ergebn.
- **Rheumatism/Inflammations/Immune responses**
  - K. L. Schmidt (Phys Med Rehab 2004; 14: 227-235): Effect of whole body hyperthermia on inflammatories and immune responses: experimental basics
- **Hemodynamic**
  - H. Bäumler (Perfusion 4/90; 138-143): Influence of infrared-A-whole-body-hyperthermia on the flow properties of blood and the hemodynamic

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- Part III

- **Hypertension/ Scleroderma**
  - Meffert/ Scherf (Akt. Dermatol. 19. Jhrg. Juni 1993 S. 141-172 u. Dermatolog. Monatsschrift 175 (1989) 733-7409: Alleviation through mild infrared-A-hyperthermia as a self-treatment
- **Fibromyalgia**
  - Brockow / Wagner (Clinical Journal of Pain, Volume 23, No. 1 2007): Open, randomised, controlled Study, exz. Ergebn.
  - Schleenbecker u. K.L. Schmidt (Phys Rehab Kur Med. 8, 1998: 113-117): Effect of an iterative, mild whole body hyperthermia on the pain of fibromyalgia
- **Rheumatism/Inflammations/Immune responses**
  - K. L. Schmidt (Phys Med Rehab 2004; 14: 227-235): Effect of whole body hyperthermia on inflammatories and immune responses: experimental basics
  - S. Kopp u. E. Faber (Vortrag Med. Woche Baden-Baden 1995): Application on degenerative rheumatic diseases and soft-tissue-rheumatism
- **Hemodynamic**
  - H. Bäumler (Perfusion 4/90; 138-143): Influence of infrared-A-whole-body-hyperthermia on the flow properties of blood and the hemodynamic

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- The overall data implies the following useful indications for hyperthermia

- ✓ **Skeletal disorders/ pain/ Rheumatism/ Myalgia**
- ✓ **Subacute and (masked) chronic inflammations**
- ✓ **Colitis ulcerosa and Morbus Crohn**
- ✓ **Morbus Bechterew**
- ✓ **(Systemic) Skleroderma**
- ✓ **Fibromyalgia**
- ✓ **Neuralgia**
- ✓ **Regeneration and rehabilitation**
- ✓ **Neurodermatitis, Allergy**
- ✓ **Hypertension**
- ✓ **Asthma bronchiale**
- ✓ **Migraine**
- ✓ **Immuno-therapy**
- ✓ **Oncology (Radiation/ Chemotherapy/ Immunology/ Cell-killing)**
- ✓ **Lyme-disease (Infection with Borrelia)**

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Interesting facts/ informations: whole body hyperthermia in **treatment of cancer:**

Extrem whole-body-hyperthermia in scope of systemicly Multistep Cancer Therapy like von Ardenne (Prof. Dr. mult. Manfred von Ardenne) is a good chance for better prognosis in all typs of cancer, sarkoma and f.e. Hodgkin- and Non-hodgkin lymphomas. The proofed data shows the results in following pages.

- ✓ The therapy needs an neurolept-analgesia without intubation;
- ✓ The therapy needs special preparation (ECG/Lab./Exam);
- ✓ The theapy needs minimum one day and night with monitoring and intensive medicine;

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Opportunities derived from studies

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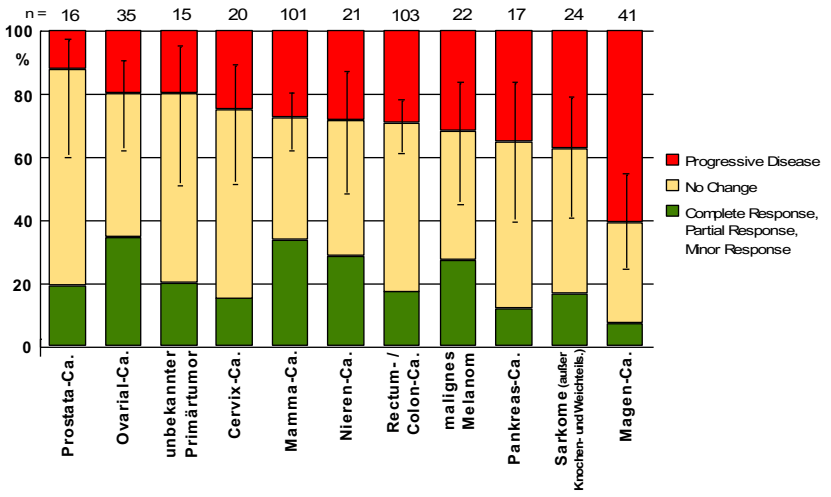
Study from von Ardenne (Whole-Body-Hyperthermia):

Source: M. von Ardenne: systemische Krebs-Mehrschritt-Therapie, page 209



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Shear, Journal of the American Medical Association (Vol. 142, 1950. p. 383ff):

- 'Are pathogenic and non-pathogenic microorganisms perhaps one of the mechanisms that nature offers to control tiny nuclei of malignant tissue? And we may be destroying one of the weapons (of biology - author's note) against malignancy by keeping natural infections in check. (of biology -author's note-) against cancer?'

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Fever is our very own power to stay or become healthy!

Ever since cancer diagnosis and treatment became a science in the 19th century, cases of 'unexplained' spontaneous cures have been reported time and again. Many of these cases were preceded by a highly febrile illness. Fever should therefore only be suppressed if there is a loss of consciousness, shortness of breath, cramps or pain, if the patient is not drinking or if the fever is too high - over 40.5 ° C - or lasts too long. Fever can be regulated very well with calf compresses.

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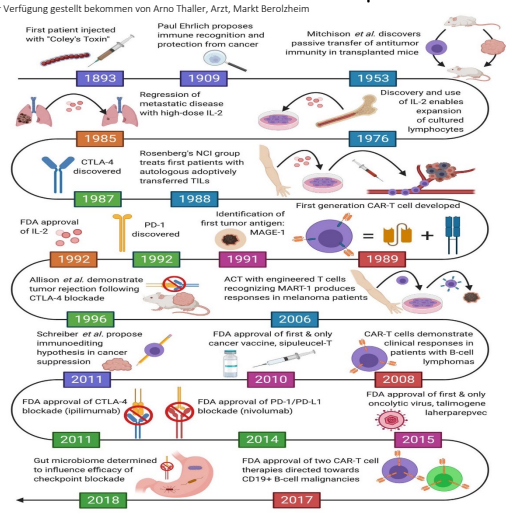
Von der Infektion über Fieber zur Immuntherapie

Quelle: zur Verfügung gestellt bekommen von Arno Thaller, Arzt, Markt Berolzheim



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Fever therapy I

- **Active hyperthermia = fever therapy**
- **Healing methods close to nature, safe to use thanks to modern medicine**
- **Low side effects**
- **Well examined**
- **Various indications:**
- **Prophylactic (primary/secondary prevention)**
- **Therapeutic (oncological/non-oncological)**
- Active fevertherapy in tumour therapy should always be an initial therapy, regardless of other therapies
- **primary or additive**

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Active fevertherapy

Contraindications
Absolute:
- Final/ terminal stages
- Respiratory distress
- Cardiac arrhythmia
- Pregnancy
- **Relative:**
- Known febrile convulsions
- Psychiatric illnesses
- Hyperthyroidism

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Active Fevertherapy

side effects possible

- Shivering
- Headache
- Nausea/ vomiting
- Pain in limbs and bones
- Dizziness and general weakness
- Rhythm disturbances (cancellation criterion if necessary)

It is not a wellness treatment!
Tell the patients!
It is best to report from your own experience!
Useful self-experiment

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Extrem whole-body-hyperthermia in case of Lyme disease

Findings from basic research

Antibiotics and Increased Temperature against Borrelia burgdorferi In Vitro

Reisinger et al. 1996

Skandivavian University Press

Subject of investigation:

Influence of temperatures on different strains of Borrelia burgdorferi

Significance for classic therapies

Study in vitro

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Temperature effects

- Reisinger et al.:
- **Temperature! Viewing from 36°C - 42°C**
- Growth at 36°C: Burgdorferi spirochaetes remained untouched
- Growth at 37°C: Cell strain B31 became less active
- Growth at 38°C: B31 & Pko significantly slowed down
- Growth at 39°C: B31 Standstill
- Growth at 40°C: Pko standstill
- ATCC 35211: was unaffected up to 39°C, slowed down at 40°C
- **Killing at 41°C (only 2 strains: B31&Pko) or 42°C all (self/ also ATCC 35211)**
- **Goal: Eradication: whole-body warming above 42°C a chance**

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Curve of extreme whole-body hyperthermia in Lyme disease

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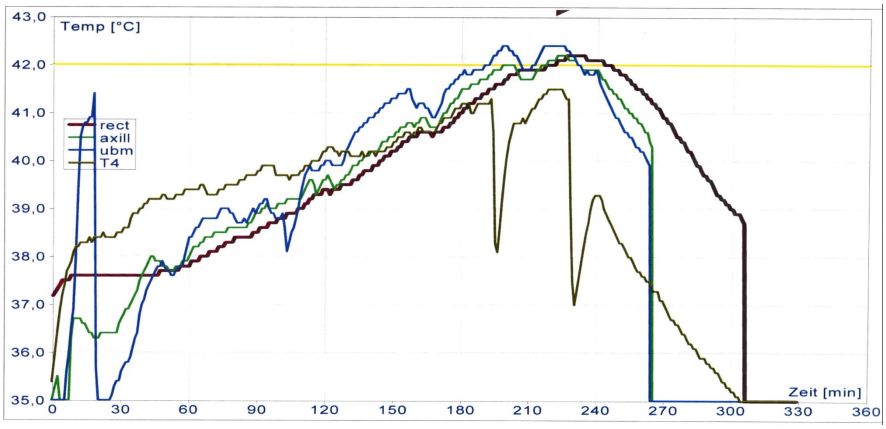
Tmax: 42,2° C
T-Plateau-Duration: 68 minutes (T>= 41,5° C)
T-high plateau-duration: 30 minutes (T>= 42,0° C)
EM43: 20,60 minutes



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Conclusion:

Hyperthermia and Fevertherapy are good examples for integrative medicine with a wide indication-area, which is close to the patient. Applied additively, it can reinforce conventional therapy options, while simoltaneously reducing their side-effects, as it can be observed in the case of chemotherapy. **The regulatory components and the activation and intensification of several physiologic processes are reasons why this therapy** can be applied in so many ways. Those, who refuse to accept the application of hyperthermia even nowadays demonstrate their lack of information and training or their lack of interest to help their patients comprehensively.

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Thank you for your attention

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Fiebertherapie = Fieber, das durch Arzneimittel ausgelöst wird

Literatur I:

Coley, W. B.: The treatment of malignant tumors by repeated inoculations of erysipelas; with a report of original cases. Amer. J. Med. Sc. 105, 487-511 (1893)

Coley W.B.: The treatment of inoperable sarcoma by bacterial toxins (of the Streptococcus of erysipela and the Bacillus prodigiosus). Proc. Royal Soc. Med. Surg. Sect. 3, (1909 / 1910), 1-48.

Review in BioEssays Oktober 2009 zur Rolle von PAMP bei der Krebsprophylaxe (230KB PDF) Artikel im American Scientist Januar/Februar 2009 (3.7MB PDF).

Review in Critical Reviews in Immunology von Uwe Hobohm, John Grange, John Stanford 2008

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Literatur II:

Review zur Rolle von Fieber im British Journal of Cancer von Uwe Hobohm 2005 (84KB PDF)

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