For a whole-body cancer therapy that is not only aiming at a palliative but also at a curative action it is mandatory that a „1 million to 1“ carcinolysis is opposed by the destruction of only one normal cell. In such a case the extermination ratio approximately reaches that order of magnitude at which the body-own defence overcomes the remnants of surviving cancer cells. To destroy cancer cells in the above ratio practically without damage to normal cells the therapy must have an extremely high selectivity. A problem known from the technical field – where very high requirements have to be placed on such a selectivity – has been solved in radio engineering in which an extremely high selectivity has been obtained in good receivers by the series connection of, say, 8 selective oscillating circuits. During the 2.5 decades of sCMT development it has been aimed at a transfer of this classical principle of radio engineering also to cancer therapy. In that way the sCMT included a meaningful coupling of several selective activity steps right from the beginning. As to its layout, the early recognised principle of the „multiuse of a single selection source“ was a substantial aid.

Linked with the development of sCMT is the publication of some hundred scientific papers. However, the effectual conditions of this therapy as well as its physiological and pathophysiological mechanisms are now being increasingly investigated by other teams whose work corroborates the concepts and results of the Dresden sCMT research (e.g.). The Phase-I-Study as well as the more than 600 therapies to date of patients with recurrent cancer who have failed to respond to currently accepted conventional cancer treatment have been performed at a treatment associated lethality rate of about 1 %. This proves the high tolerance of sCMT.

References
And other!
The principles of the sCMT

At present the systemic Cancer Multistep Therapy (sCMT) \[1,2\] is used as a complementary treatment of all kinds of cancer therapies. Firstly, it is applied to patients with recurrent cancer who have failed to respond to currently accepted conventional cancer treatments \[3,4,5\]. The fundamentals of the concept developed by Prof. Manfred von Ardenne in 1965 are the concurrent application of the synergistically acting steps of an extreme whole-body hyperthermia, induced hyperglycemia and relative hyperoxemia. Secondly, it is a possibility in the fight of better prognosis, when it is used as an neoadjuvant step, e.g. before surgery or in complementary aspects by the adjuvant therapy after surgery maybe in addition to chemotherapy or radiation.

The step of an extreme whole-body hyperthermia, employed since 1989 within the framework of the IRATHERM® 2000 hyperthermia technique developed and produced by the „Von Ardenne Institute of Applied Medical Research (GmbH)” in Dresden, now operates with a (hyperthermia dose) level of 42.0 – 42.3 °C body-core temperature applied over 60 – 90 minutes \[2\]. It serves for the thermal carcinolysis, the selective inhibition of the micro circulation in cancer tissue and therefore for the intensification of its selective acidification by hyperglycemia.

Via a drastic increase of the glucose offer in the tumour tissue by means of a highly dosed glucose infusion \[5\] at optimal timing the step of induced hyperglycemia causes a selective stimulation of the aerobic glycolytic metabolism of cancer cells (discovered in 1924 by Otto Warburg). And therefore the over-acidification damages the cancer cell membranes and the membranes of the cell organelles. This over-acidification causes a selective increase in the thermo-sensitation of cancer cells by about 1.5 °C and, in addition, an increase in its radio-sensitisation by a factor 2.5 as well as an enhanced effectiveness of simultaneously applied cytotoxic anti-cancer drugs. These facts are of great therapeutic significance because the temperature of 42 °C alone is still insufficient to cause an adequate damaging of cancer cells. Moreover, the strong increase in the blood glucose level during the extreme hyperthermia phase concurrently contributes to a maintained hemodynamic and respiratory sufficiency.

The amount to which the highly selective lysosomal cytolysis chain reaction – which takes place in the acidic milieu or under sCMT conditions – contributes to therapeutic cancer cell damage has not been explored to the full. Furthermore, the share in cancer cell damaging caused by the inhibition of microcirculation during the hyperthermia phase is still obscure. The selective inhibition of microcirculation in the cancer tissues is also promoted by its over-acidification.

The step of the relative Hyperoxemia is implemented by the controlled oxygenation of the inspired air during the extreme hyperthermia phase, using a non-contacting applicator with a laminar flow of approximately 20 l O₂/min (10-30 l O₂/min) \[1,2\] for the purpose. This flow allows for an adaptation to the respiratory minute volume (RMV) that substantially increases as a consequence of the increased metabolism obtained at the 42 °C whole-body temperature. The individual adaptation of the O₂-flow rate takes place in such a manner that the oxygen partial pressure during the hyperthermia phase exceeds its initial value by more than 30 mm Hg whereas the partial pressure of the carbon dioxide is kept below 55 mm Hg. In order to ensure an enhanced stress tolerance, this oxygenation measure cannot be dispensed with.

Within the framework of sCMT the oxygen is further used for a second purpose. The Oxygen Multistep Therapy is applied ambulant prior to and after the main treatment day in 2-hour sessions distributed over a period of 9 to 18 days. After the check of a great immune status, immune modulating measures will be realized concurrently to the Oxygen Multistep Therapy. The framework of sCMT serves for the reconditioning of cancer patients who have been weakened by conventionally cancer therapies and the advanced illness as for a renormalization of the immune system. Furthermore, it is employed after the day of main treatment to further stabilize the immune balance in addition to continued conditioning.

Developed especially for this purpose, the IRATHERM® 2000 Infrared-A hyperthermia technique of the 3rd generation operates without interfering high-frequency fields and ensures free access to the patient from all sides. In that way, trouble free patient monitoring by electronic and other means becomes possible without difficulty.