The biological effect of light on the human body

LUMOMED We about us

As early as the middle of the 1960s the Hungarian surgeon Endre Mester noticed an improvement of wound healing when using Low-Level-Laser light (LLL). Since then the number of scientific studies about the biological effect of laser light irradiation has been growing steadily. Numerous scientific organisations have been looking into this matter for years (see www.dr-wilden.de/Linkliste).

In the fields of application wound healing, chronic orthopaedic problems like osteoarthritis or spinal diseases, acute strains like tendosynovitis, skin problems, allergic reactions and other problems general practitioners have to treat the courses of therapy we have seen since 1986 are confirming the therapy documentations about laser therapy which even then already existed in English literature.

Since then this has encouraged us to enlarge the technical quality and our therapeutic experience of the biological effects of laser therapy. We are working in close coordination with current scientific results of Low-Level-Laser therapy (see www.dr-wilden.de).

In the 1980s problems of sudden (like ISSHL) or chronically increasing problems of the inner ear became the focus of public and medical-therapeutic interest. Organic symptoms of chronic excessive strain of the inner ear are, for example, tinnitus, hyperacusis (hypersensitivity of hearing) and dysacusis (distortion of hearing), pressure in the ear, partial deafness and loss of hearing, vertigo and Morbus Menière (rotatory vertigo with nausea and vomiting). See also www.dasgesundeohr.de.

The individual suffering which is behind the emergency signals of our organs of hearing and balance, as well as the tremendous loss of quality of life for the patients has concerned us more and more.

We were spurred on by early reports within laser literature about the positive effects of laser light on nerve cells and nerve injuries (among others Dr
Rochkind/Tel Aviv, Dr Oshiro/Tokyo) and by three existing German studies about tinnitus therapy by laser light (Dr Witt/Hamburg, Dr Landau/Erfurt, Professor Plath/Recklinghausen). The perceptible and measurable positive results, getting more and more distinct, of our treatments of diseases (especially of the inner ear) with Low-Level-Laser therapy have encouraged us to develop in the course of more than 20 years the therapy quality of Lumomed and the high-dosage Low-Level-Laser therapy according to Dr Wilden® for the treatment of inner ear problems and other diseases which can be treated by laser light (see www.lumomed.de, www.dr-wilden.de).

In the meantime we have treated several thousand patients with the high-dosage Low-Level-Laser therapy according to Dr. Wilden® and with our mobile home therapy laser devices.

Many of our patients confirm by their reports the fundamental efficacy of laser light which they experience as subjectively positive and which at the same time is objectively measured by an increasing hearing ability.

Some of our patients are putting all their efforts in trying to inform responsible persons and institutions within our public health system about the quality of Lumomed’s therapy and the high-dosage Low-Level-Laser therapy according to Dr Wilden® (see www.tinnituspatient.de).

We want to thank all those people, all our patients who have confided in us and all other people who are fighting with us for an improvement of the situation of inner ear patients and for the prevention of excessive strain of the inner ear (see www.mausini.com).

Hippocrates said that the gods had set the diagnosis before any treatment. We of Lumomed think that additionally before any therapy by Low-Level-Laser light there should be the effort of the therapists to understand this therapy, used on themselves and the patients, as well as possible. Also they should tell the patients what they know so that their process of experience and healing is further supported.

To this we want to contribute by adding a second information web site (www.biolaserlicht.de) to the already existing www.dasgesundeohr.de.
Light is commonly perceived as positive

Probably every human being sees that light has a perceivable biological effect on our body. The first sunbathing in spring, pleasantly going to sleep in a deckchair in the warm sunshine, the hunger for more and more sunlight from winter to spring and from spring to summer, the disappointment if the weather is worse than we would like, the joy if the sun comes out again, but also the filling of our hunger for the sun when we have had enough light.

On the other hand we usually experience lack of light as tiring and unpleasant, and this even more distinctly the longer the lack of light continues. But in spite of everyone perceiving and experiencing the effect of light on one’s body there is no commonly accepted knowledge about it. Thus the question of the biological effect of light on our body is quite justified.

This is why we would like to introduce to you an understandable model of the mechanism of high-dosage Low-Level-Laser therapy according to Dr Wilden® and the self therapy with our Lumomed home therapy laser devices which is deducted from it.

The essential terms in this introduction are energy, body energy, ATP (adenosine triphosphate), molecular binding energy, electromagnetic energy and especially electrons.

The meaning of the term : model

As we cannot see energies, no matter if they are, for example, electrons thought as particles or as waves, we need models.
Science is in many fields just the attempt to make clear by a model things we cannot perceive with our natural senses. This applies also to biology.
In this sense the following representation of the effect of light on our body is a model as well as the, in my opinion, out-dated biological idea of energy.
In physics there is the principle: The correctness of a model has to be confirmed by experimental examination.
That means that the respective theory must be able to explain scientifically logically and without contradictions occurrences in nature we can perceive with our senses.
It is commonly accepted in science and directly (in experiments) to experience by us that light has a biostimulating effect on plants as well as on animals and human beings. At the same time the positive clinical results of Low-Level-Laser therapy have been known since the middle of the 1960s and can be seen with the naked eye in the first indication of laser therapy, wound healing.
Low-Level-Laser light has long since fulfilled all demands for the verifications of medicines and is fulfilling them again daily in serious research and application of LLLT.
Thousands of clinically documented healing successes and patients’ reports give evidence for the biologically positive biostimulating effects of Low-Level-Laser light.
This new biological model is, to tell the truth, not yet scientifically accepted in the legal sense (it is well known that this takes time), but it can give us nevertheless a logic and understandable view of our cellular energy production and thus of the biological mechanism of laser light. More than that, it can also help to broaden our idea of the human body in a way that enables us to understand how light affects us biologically, completely viewed separately from laser therapy.

This has been well-known in science since 1998:

I published, together with the physicist Dr Rainer Karthrein, an exact presentation of the meaning of the wave aspect of electrons for the understanding of our cellular energy production in the following media: Journal Clinical Laser Medicine & Surgery, Volume 16, no. 3, America, June 1998 Laser Medizin, Volume 15, 1-2, Urban & Fischer, Germany, January 2000 (the organ of the German Society of Laser Medicine e.V.) Also 9 times in a row since 2003 in Laserzahnmedizin Jahrbuch des Laserjournals

Also I presented it on numerous international medicine congresses and in further professional journals and books (see www.dr-wilden.de, publications, ask for password).

So far the established biological sciences have not protested against this work.

Is light dangerous for us?

Only the small range of wavelengths of the ultraviolet (invisible for us) part of natural solar radiation is potentially dangerous for us. The whole of the visible part of natural solar radiation from the visible violet wavelength from 400 nm are all biologically completely harmless.
Every living being can live in this quality of light for years and decades without suffering any harm. In millions of years our biosphere has developed under the continuous physical effect of light on the living, organic structures of all living beings without them suffering any harm. On the contrary, the whole biosphere is driven by the energy of natural solar radiation.

Biology determines our personal idea of our body

The idea we have about our own body, that is, our idea how it looks and works “inside” and so what is “good” for it or not, today is almost completely determined by the sciences of life, that is, the biological and medicine sciences.

Let’s have a closer look on the old models and the resulting idea of the body in biology.
The biological idea of energy

The biological model about energy working inside the cell, for 50 years taught without much change, is consistently restricted to an energy thought as matter. This energy passes between the biological molecules as electrons thought as particles.

These electrons flow out of the molecules and are caught by other molecules to be passed on from one molecule to the other (Bruce Alberts, Dennis Bray, Julian Lewis, Martin Raff, Keith Roberts, James D. Watson – Molekularbiologie der Zelle – VCH Verlagsgesellschaft mbH, D-69451 Weinheim).

There do not exist any electromagnetic waves and their varied possibilities of coordinated interaction and energy transmission.
Light energy, electromagnetic energy, body energy

Light is electromagnetic.

Because of the power of determination of the biological model on the idea of our body we have usually no clear idea about the energy that is working in our body. This term is not existent either in the official medical routine which defines itself as scientific. Nonetheless this energy is really there.

If we lift a weight we have to do physical work.

To do this, our body needs energy. This we can see clearly if we let a machine do our physical work. Every machine needs energy to do its work. Today electric machines and devices are relieving us of a lot of physical work. Electric energy is produced in power stations which have to produce it from some primary energy.
On the outside of our body energy is quite real to us. So, if our physical work can be done by scientifically obvious energies then our body itself has to work with an energy which is scientifically definable.

The commonly accepted physical definition of energy

Energy in its basic physical form is electromagnetic energy.
This is told by Einstein’s famous formula:

\[ E = m \times c^2 \]

As consequently \( m = E / c^2 \) this means that also any matter (including any kind of necromass) ultimately is, in its purest form, electromagnetic energy.

The same is told by Max Planck’s formula:

\[ E(J) = \frac{h \times c}{\lambda} \]

Wavelength is, together with frequency, the physically accepted description of any electromagnetic energy. That means that any measurable energy can be traced back to its respective wavelength.

As we can measure the energy in our respective energy sources (in joule or calories) our body energy, which we can also measure (e.g. how much joule or calories we spend for this or that physical action), ultimately has to be in its purest form electromagnetic energy. Thus it can be described exactly in its wavelengths and frequencies.

The energies essential for our cellular energy production and their respective processes of energy transmission are physically correctly and clearly presentable in their respective wavelengths and frequencies, and so they are also for us distinctly imaginable.

**The physical definition of the electron, the particle-wave dualism**

As already mentioned biology describes the energy processes going on in all living beings by the term electron, restricting the term consistently on the particle aspect of the electron.

Physically, however, the electron has got a double definition. The energy called electron has got a particle property and, at the same time, a wave property. We call this the particle respectively the wave character of the electron.
Both definitions were awarded the Nobel prize.

In the further course of this presentation I will show how the biological functionality of our cellular power plants as well as the biological effects of Low-Level-Laser light and light on our body can be explained considering the wave property of the electron.

How our body produces its energy – the power plants of our cells

Our body is made of about 5 trillion cells. Each of these cells is a singular living being and, to be able to survive, it has to take in energy from its environment and then transform this taken energy into its own kind of energy, the cell energy. For this the cell needs its ”power plants” (mitochondria), of which each body cell can have more than 1,000.
This means that every one of these body cells which make up our body depends on the same energy principle as our technical energy production.

To make our electric devices work we have to give them energy which they can use. As we cannot produce energy from nothing we have to produce energy fitting for our electric devices from those energies we find in our environment and which we call primary energies. This energy we call electric energy or electricity.

To produce that we need power plants. The people have thought of varied things for this end, from the water wheel to the hydro-electric power plant, from coal-burning power plants to oil- and gas-burning power plants and nuclear power plants (= steam power plants), from wind power stations and tidal power plants to the solar power plant.

The principle of each technical power plant is the same, however, for all the diversity of their respective primary energies.

We need an energy converter (= a power plant) to produce a secondary energy (electricity) from a primary energy.
ATP (adenosine triphosphate) – the secondary energy of our cellular power plants

Nature saw this principle millions of years ago and created, when creating the first biological living beings, the protozoa, a biological power plant which today still works in every single one of our body cells. This cellular power plant is called mitochondrion.

This biological power plant follows the same principle as our technical power plants. From a primary energy is produced a secondary energy by using an energy converter.

In the case of the biological power plant mitochondrion, the secondary energy is a molecule rich on energy, the adenosine triphosphate (ATP).

Adenosine triphosphate (ATP) is the universal cellular energy of all living beings on this planet.
All living beings, all plants, all animals and also the human beings need for being alive the same energy-rich molecule, the same cellular fuel adenosine triphosphate (ATP).

Thus ATP is the universal biological energy source which is at the root of the entirety of life, of being able to be alive. In all cells of plants, animals and humans the cellular fuel ATP is produced by the same cellular power plant, the mitochondrion.

In addition to the mitochondria plants have the so-called chloroplasts which also produce ATP and are very similar to the mitochondria.

All electronic devices and machines need electric energy to work. All living beings need biological ATP energy to live.

**How does ATP work within the cell?**

Just as we can understand the function of electric energy within our electric devices we can understand the function of ATP within the body cell. Corresponding to the current stand of biological knowledge we can explain the function of ATP within the body cell in a simple way like this:

Adenosine triphosphate is produced in the mitochondrion. The mitochondrion give its secondary energy (ATP) to the cell dependent on the cell’s need of energy. Every single one of our body cells constantly needs energy, and its need of energy always varies.

Every body cell needs ATP for any work process. No matter if this process is e.g. the contraction of muscle or sinew cells or an inner process like the function of heart, liver, kidneys or glands, e.g. the...
production of sweat, saliva or gastric juice or the activity of our nerve cells, for example our sense and brain cells. All body cells need the biological cellular ATP energy for all work processes. The energy-rich molecule ATP, which is produced by the mitochondrion, is characterized by one energy-rich binding. This is situated within the third binding of ATP’s phosphate chain.

The electromagnetic binding energy stored there is transported by the ATP molecule within the cell to the place where the binding energy of the third phosphate chain is needed. If, for example, muscle cells are contracting, they use ATP. For this the ATP molecule gives the electromagnetic energy stored in its third phosphate binding to the molecular structures which need it. This enables the muscle cells to contract.

While the ATP molecule emits the electromagnetic molecular energy stored in its third phosphate binding, the third phosphate separates completely from the mother molecule which thus changes to adenosine diphosphate (ADP) with one free phosphate atom.

Both, the ADP as well as the free phosphate atom, then go back into the mitochondrion to get recharged to ATP by the mitochondrion’s primary energy, that is the energy got from the last molecule of our nutrients. In this process the free phosphate is reconnected to the ADP and the low-energy ADP changes to the energy-rich ATP.
The primary energy of our cellular power plants

How do we experience these processes within our body cells?

From a certain point we experience all these cellular processes we need for the functioning of our whole body as weariness and hunger. An increasing lack of biological cellular ATP energy forces a weariness of our body which can slowly increase or suddenly occur. This weariness occurs sooner or later after all physical or mental activities and can increase to the point of closing the eyes and sleep. Like it or not, we have to reduce our cellular energy use or provide new primary energy. That means that we either go to sleep or get hungry.

Our hunger forces food intake to still the need for more primary energy of our cellular power plants. When we have to work hard we need a correspondingly high energy input.

We have to eat because we need energy. More correctly, because we need new primary energy for our cellular power plant.
The primary energy and the understanding of a power plant

The functionality of a power plant is defined by its primary energy. A wind power station works the way it does because its primary energy is the energy of the wind and not that of flowing water, and this applies vice versa for a water power plant and any other power plant technology.

For a wind wheel the wings are essential, as for a hydro-electric power plant or a steam power plant the respective turbines and for a solar power plant a surface which takes in the electromagnetic radiation of the sun and transforms it into electric energy.

The construction of our cellular power plant is that of a large surface.
This large inner surface is called inner mitochondrial membrane. It is folded into itself which creates a large surface within a small space, and it is very much enlarged by a huge number of small burlings or “mushrooms” which extend into the space between the membrane folds.

We know this principle of enlargement of inner surfaces within the body also from other organs, like the bowel (villi intestinales) or the lung (alveoli). This obvious construction principle of our cellular power plant corresponds to the technical construction principle of a solar power plant.
The energy in our nutrients

The energy sources of our food are
1. the carbohydrates like for example in bread, sugar, noodles etc.
2. the proteins like for example in meat, fish, eggs
3. the fats like for example in butter, lard, bacon, oils etc.

What all of our nutrients have in common is that they are carbon molecules which, in turn, are products of the biosphere and thus are assembled in the energy level of natural solar radiation.

We are only able to use organic molecules as energy sources, not inorganic substances like for example salts or metals. Those we need as components for the construction of our biological molecular structures, but we cannot produce energy out of them. The energy of our nutrients comes exclusively from biological molecules which all are synthesised within the biological circuits of the biosphere, that is within the energy field of natural solar radiation.
The energy which was necessary to construct our nutrient molecules is still stored within them. Our body has to extract this energy stored within our nutrient molecules to be able to use it as primary energy for its cellular power plants. This process we call digestion.

Our digestion

Let me clarify the digestion with the example of a hotdog.

When eating a hotdog the carbohydrates of the roll are broken in the mouth by the enzymes of the saliva (that is why bread respectively a roll becomes sweet if we chew it long enough).
For the digestion (breaking) of the proteins (the sausage) we need the hydrochloric acid of the stomach.
For the digestion of the fats we need the digestion work and the enzymes of liver, gall and pancreas.

The nutrients broken down like this are then resorbed from the bowel into the blood. By then we still have not received the energy of the hotdog. On the contrary, the digestion first needs energy, that is, the cellular ATP energy which has to be brought by the body cells involved in the digestion process to master the necessary cellular work for the digestion process. This is why we get tired after a meal, and the more tired the more we have eaten and the more digestion work our body has to do.
When the nutrient molecules sugar, amino acids and fatty acids are resorbed into the blood, they are transported to every single one of our cells. When they have arrived there, the last part of our digestion begins, the disintegrating cellular metabolism.

Simply spoken, within the respective body cell the sugar molecules as well as the amino acids and the fats are disintegrated to the last molecular component of our nutrients, the pyruvate, also called pyruvic acid.

**Ingestion**

![Diagram of nutrient absorption](image)

After the reabsorption into the blood the broken nutrient molecules are transported into every single one of the cells. There the intracellular metabolism to pyruvate takes place.
Within the pyruvate the energy of the ingested food still is not prepared sufficiently to fuel our cellular power plant as primary energy. It is still bound within the electromagnetic molecular binding energies of the pyruvate. These are the covalent binding energies between the carbon atoms of the pyruvate and the hydride bindings between the carbon, hydrogen and oxygen atoms. To be able to be active as primary energy for our cellular power plant, as the last step of our digestion the pyruvate has to free its molecular binding energies. This happens the moment when, in the presence of molecular oxygen, pyruvate breaks into CO2 + H2O (= carbon dioxide which we exhale and water which stays within the body).

This process is called mitochondrial energy transfer. The old biological model of this process is one of matter energy which is flowing as energy-rich electrons out of the pyruvate and into the inner mitochondrial membrane.

This is hard to understand.
We say that in our cells sugar is burnt together with oxygen, but we know, of course, that nothing can really burn within our cells. The old model calls this process also cell breathing, but at the same time we know that our cells do not really breathe. Could this nebulosity concerning the imaginability of the energy transfer within the model of energy as matter be the reason for the fact that numerous biologists and medical scientists do not like to discuss cellular energy production?

The last step of our digestion is a light process

But if we extend the particle property, which has until now been the only one respected, by the wave property of the electron, suddenly we get a conclusive model of the really running physical processes in our cellular energy production. Let’s start with the energy set free by the pyruvate. According to all existing physical insights this energy is electromagnetic. That means that the really existing energies between the atomic structures of a molecule are physically definitely describable with the specification of their wavelength and frequency. The binding energies of the pyruvate are measured in joule. As a molecule always is a dynamic, that is a moving, structure, there is metrologically one energy field for all molecules.

When we now put those energy fields of the binding energies of pyruvate measured in joule into Planck’s formula

\[ E(J) = \frac{hc}{\lambda} \]

there is only one unknown factor left is \( \lambda \) (wavelength). By simply transposing this formula to

\[ \lambda = \frac{hc}{E(J)} \]

we can describe and see the binding energies of the pyruvate, which are set free on its dispartment into water and carbon dioxide, in their respective wavelengths.

When we put in the measured energy figures of pyruvate’s binding energies and the corresponding data for \( h \) and for \( C \), we can see that the energy breaking free of the pyruvate and going into the mitochondrion has got a wavelength range from ultraviolet wavelengths over the complete range of visible light to infrared wavelengths.
Physically correctly spoken we can describe this process, which is the last step of our digestion, as a radiation process on the energy level of natural solar radiation going from the pyruvate into the mitochondrion.

Let’s go back for a moment to the technology of a technical power plant. Here it is clearly de rigueur, as I have said, to know and physically understand the respective primary energy to understand the functioning of a technical power plant.

This applies, of course, also to our cellular power plant. To understand the biological technology of our cellular power plants we have to understand their primary energy.
Of course there is a main difference between describing our cellular power plant’s primary energy as clearly measurable electromagnetic radiation energy (= light energy) or thinking of that energy as flowing mass of energy-loaded particles (= electrons thought as particles).

When respecting, as is obligatory in the philosophy of science, the wave property of the electron we see that the mitochondrion’s primary energy can be described as electromagnetic radiation energy.

**Our cellular power plant can take in light as primary energy**

Now I will describe physically conclusively and graphically how our cellular power plant takes in nutrient energy respecting the wave property of the electron. The biological structure of the mitochondrion that can take in energy is its inner membrane, which is surrounded by the so-called matrix, the fluid filling the inside of the mitochondrion. The inner mitochondrial membrane is peppered with countless light absorbing molecular structures. Until now these have been called electron carrier. The term electron carrier is a scientific auxiliary term. This term is forced linguistically by the energy thought of as particles in the old model. This auxiliary term exists only in biological models. It is unknown either in physics or electro technology.

A scientifically obsolete term hampers understanding

In the obsolete biological model those electron carriers are supposed to hand energy-rich electrons from one to the other. During this the electrons thought as
particles are supposed to fall down potential differences and give their energy to the cellular power plant. This then is supposed to transform low-energy ADP+P into energy-rich ATP from this energy thought as matter of the electrons by using pump-like things which, again, only exist in the old model. Surplus electrons are supposed to be caught by oxygen.

**Electron carriers are antennae pigments**

All electron carriers have the physical ability to resorb electromagnetic energy. Thus they can be called antennae pigments.

The absorption behaviour of the antennae pigments for electromagnetic radiation has already been photometrically defined years ago. (inter alia: Christian de Duve “The Cell”, expedition to the basic structure of life, Spektrum, Akademischer Verlag, Heidelberg – Berlin – New York)

For the definition biological structures of the inner mitochondrial membrane radiographed by light in front of a monitor. Those wavelengths which do not arrive at the monitor, that is, those which are reabsorbed by the radiographed biological structures, are cataloguised and allotted to the respective biological structures.

The structural composition of the mitochondrion is well researched. The light-absorbing antennae pigments are strung together in a million fold of always recurring, alike structures. This structure is called respiratory chain. The outer form of the single antennae pigments is defined by their light-absorbing centre.

The biological effect of light on the human body
Their ability to absorb electromagnetic energy goes from ultraviolet wavelengths over visible light to infrared wavelengths.

In the terms of power plant technology the inner mitochondrial membrane is a biological collector surface highly sensitive for light. It is able to absorb completely the light which the pyruvate emits directly in front of this collector surface as the last step of our digestion.

In consideration of the wave property of the electron our cellular power plant is run by light within us (the energy of our nutrients) as well as by light which touches us from without (the energy of natural solar radiation and, for example, of Low-Level-Laser light).
For a light-absorbing structure it does not matter, physically, where the light comes from which falls on it. For our cellular power plants this means that it is in their nature to be open for light, for light from without as well as for light from within. This is their only intention. They do neither want to nor be able to do anything other than taking in electromagnetic energy and transforming it into cellular energy (ATP).

The role of oxygen for cellular energy generation

We need molecular oxygen (O2) to live. About three minutes after the interruption of the administration of oxygen we die. We need molecular oxygen within the body exclusively for our mitochondrial energy production. Correctly spoken we die because our cellular, mitochondrial energy production (ATP production) crashes because of the interruption of the administration of oxygen and because, for that reason, all cellular, energy-consuming processes come to a stop.

What role does the oxygen have in detail?

As already mentioned, in the old biological model, which thinks of energy as matter, oxygen catches surplus electrons. How it does that the old model cannot explain.

Oxygen absorbs surplus energy

On examination of the role of oxygen in the process of cellular energy generation its absorption behaviour is important. Oxygen (O2) absorbs electromagnetic energy within the wavelengths from 300 nm (UV) over UVB and UVA to infrared...
wavelengths (from 700 nm) and further on. That means that O2 indeed “catches” energy, but physically correctly spoken oxygen absorbs this surplus energy which radiates from pyruvate into the mitochondrion. This is necessary because within our nutrients there is more energy than the mitochondrion can take in. Thus oxygen plays its old role as energy buffer also within the modern energy model of our cellular energy production, which considers the electron’s wave property.

The new energy model goes with the old structural insights of modern biology

Within the biological explanation models the only problem is the old energy model, that means its physically incomplete description and exposition. The structural breaking down of the molecular structures at work is still correct. The biological energy model expanded by the electron’s wave property completely fits in the previous knowledge about the molecular construction of our body. It does not need any adaptation of our previous molecular biological knowledge about how our cells are constructed and how they work.

This we can see clearly in the following statement of Prof. Gottfried Schatz:

“Take somebody’s hand and feel its warmth. Gram for gram it transforms 10,000 times more energy than the sun. Hard to believe? Here are the figures: In average a person weighs 70 kilograms and consumes about 12,600 kilojoules daily; that is about 2 millijoules/gram and second or 2 milliwatts/gram. The sun manages pathetic 0.2 mikrojoules/gram and second. Some bacteria, like the ground bacterium Azotobacter, even can transform up to 10 joules/gram and second and thus outdo the sun by a factor of 50 millions. I am warm because within every single one of my body cells dozens, hundreds or even thousands of mitochondria burn the food I have ingested.”
To get a physically understandable model it is sufficient to imagine the “burning” of our food as the light and radiation process described above, which includes, beside the wavelengths of visible light, also infrared wavelengths (= wavelengths which produce warmth).

The therapeutic consequence

In our point of view one of the therapy qualities of Lumomed is the conclusiveness of effect and result: Low-Level-Laser light of good therapeutic quality stimulates the cellular energy production (ATP production) and thus increases the cellular regeneration processes existing in every body cell.
This basic conception of the effect of Lumomed laser therapy quality explains the precise effect profiles of the therapy in predictable regeneration processes, e.g. for the therapy of inner ear excessive strain, as well as the variety of the fields of application of the high-dosage Low-Level-Laser therapy according to Dr Wilden®. This is because the above-mentioned active principle applies for all body cells similarly because all body cells produce their cellular energy using the same cellular technology of energy production within their mitochondria.

Why is Low-Level-Laser therapy still not commonly accepted?

We are concerning us with that question every day. This is a vast area. Important interests of class and economy are included as well as political interests and social and individual factors. We will continue to try to find still more distinct models to this question for ourselves, just as we try to inform concerned and the public about the organs of hearing and balance on our information web site www.dasgesundeohr.de, and just as we are informing about the biological effect of light on the human body on www.biolaserlicht.de. This more distinct model we intent to present continuously to the respective interested public (see also www.tinnituspatient.de).

On www.dasgesundeohr.de/ “some critical comments on TRT” we already have presented some facts about this. But perhaps the following quote of Max Planck can help us for the time being: “A new scientific truth usually does not establish itself by the way that its opposers are convinced and declare themselves as instructed, but by the fact that its opposers die out after some time and the new generation is being acquainted with the truth from the start.”

But do we still have sufficient time to save our ears in the face of numerous current medicinal problems in general and the special problem of ever increasing...
excessive strain of our inner ears? Or do we have to surrender them completely to the massively pushed strategies of market extension of the hearing aids’ industry and its allies?

Fig. 40: Computerdarstellung der Therapiesituation der hochdosierten Low Level Lasertherapie am Hör- und Gleichgewichtsorgan

This, dear readers and especially dear patients, lies in your hands alone. Even if we cannot change the world, you can, with our help, definitely change your personal situation for the better.

Further information you can find on the following web sites:

www.lumomed.de
www.dr-wilden.de
www.dasgesundeohr.de
www.tinnituspatient.de
www.biolaserlicht.de

Also we are pleased to be at your disposal for a personal counselling interview.
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Abb. 20: Querschnitt durch das Mitochondrium; Quelle: Joachim Ude, Michael Koch: Die Zelle, Atlas der Ultrastruktur, Gustav Fischer Verlag Jena
Abb. 21: Die physikalischen Eigenschaften der Primärenergie bedingen das Bauprinzip eines Solarkraftwerks
Abb. 22: Tägliche Energiezufuhr des Menschen
Abb. 23: Strukturformel von Zucker, Aminosäure und Fetten
Abb. 24: Unsere Nährstoffe werden im Energiebereich der natürlichen Strahlung synthetisiert
Abb. 25: Transport der Nährstoffe im Blut
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Abb. 27: Mitochondrialer Energietransfer (Teilchenaspekt)
Abb. 28: Mitochondrialer Energietransfer (Wellenaspekt)
Abb. 29: Computerdarstellung des mitochondrialen Energietransfers als Strahlungsprozess LE=Lichtenergie, MM= innere Mitochondrienmembran, MB= molekulare Bindungsentnergie
Abb. 30: Gegenüberstellung von Teilchen- und Wellenaspekt des Elektrons
Abb. 31: Elektronencarrier, schematische Darstellung
Abb. 32: Computerdarstellung der Energieaufnahme unseres Zellkraftwerkes unter dem Wellenaspekt des Elektrons, MM= innere Mitochondrienmembran, LE= Lichtenergie, AP= Antennenpigmente, ATP= Adenosintriphosphat
Abb. 34: Computerdarstellung des mitochondrialen Energietransfers als Strahlungsprozess LE=Lichtenergie, MM= innere Mitochondrienmembran, MB= molekulare Bindungsentnergie
Abb. 35: Darstellung der unmittelbar anregenden Wirkung von außen einwirkender elektromagnetischer Strahlung eines therapeutischen Low Level Lasers. ZK= Zellkern LLL= Low Level Laserlicht, ATP= Adenosintriphosphat, M= Mitochondrion, S= Stimulation
• Abb.36 Die Aufgabe des Aufnehmens überschüssiger Energie (Elektronen) im alten Modell durch Sauerstoff entspricht den Absorptionseigenschaften des Sauerstoffs gegenüber den aus dem Pyruvat frei werdenden überschüssigen elektromagnetischen Bindungsenergien

• Abb.37 Computerdarstellung einer Zelle mit Mitochondrien
• Abb.38 Wirkschema der Low Level Lasertherapie
• Abb.39 Wirkkette von Laserlicht in der Zelle
• Abb.40 Computerdarstellung der Therapiesituation der hochdosierten Low Level Lasertherapie am Hör- und Gleichgewichtsorgan

• = eigene Bilder