Principles of regenerative therapy with low-intensity laser, colour, ultrasound and magnetic field (coMra)

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Abstract

For decades the main focus of global public health has been on the quantity of years lived, even though the quality of living those years is declining. The burden of disability as a result of chronic diseases is rapidly growing worldwide, due to the simple fact that methods of fighting against various causes of death are not suited to the purposes of building up health. We propose that therapeutic technologies that enhance the quality of health should follow the same fundamental principles that underpin the organisation of life at all levels: regeneration, self-sufficiency, evolution, interconnectedness and intelligence. The regenerative technology of coMra therapy implements these fundamental principles of life by combining low-intensity laser, colour, ultrasound and magnetic field into a united coherent vortex that comprehensively supports self-regeneration of the body.

Keywords: *coMra, low level infrared laser, magnetic field, ultrasound, colour LEDs, regeneration*

INTRODUCTION

Healing with light, colour, magnetic field and sound holds a remarkable opportunity for improving the quality of health through regeneration. This opportunity is particularly important owing to an urgent need for holistic medical technologies that are safe, effective and supportive of the natural self-repairing ability, immune defences and self-sufficiency of the body.

Introduced in 2009, the technology of coMra therapy represents a concept of supporting the body's innate ability to heal itself through regeneration. The technological developments that form part of coMra therapy were brought about mostly during the 20th century, with the development of biophysics and therapeutic applications of colour, ultrasound, laser and magnetic field. The introduction of coMra therapy followed the vision of synthesising these radiances into a united coherent vortex that comprehensively supports regenerative processes in the body. The method of such synthesis was inspired by the fundamental principles of life.

Previously we described the biophysics of coMra therapy (Surazakov et al. 2020). In this paper we introduce the conceptual background of coMra therapy and our vision for supportive regenerative technologies in general.

FROM QUANTITY TO QUALITY OF HEALTH

The main focus of global public health has been on the quantity of years lived, even though the quality of living those years is declining. The largest systematic study of the global burden of 369 diseases and injuries revealed that life expectancy from 1990 to 2019 has increased in 202 out 204 countries and territories (Vos *et al.* 2020). Undoubtedly, this marks a remarkable and most welcomed achievement. However, the study also revealed stagnation and even degradation in the quality of health, measured as the number of years lived with disability. There is a nearly universal trend towards increased disability due to chronic diseases such as diabetes, musculoskeletal conditions and mental disorders. And most strikingly, in many countries with very high healthcare expenditures the overall burden of disease started to worsen, as a result of disability.

The key challenge of the global increase in disability is that methods of fighting against various causes of death are not suited to the purposes of building up health (Ayres 2020). This is clear to see if we consider cell injury, a cornerstone of manifestation of a disease. The vast majority of methods in

medical practice today eliminate cause of cell injury or block pathogenic responses. For example, if a person is experiencing weakness due to atherosclerotic plaque that is reducing blood supply to the heart, then the plaque can be mechanically removed. But if the weakness is caused by deterioration of the heart muscle, then the problem cannot be simply removed or blocked. The symptoms will persist until the structure of muscle cells is restored to a healthy state. Therefore, treatments that work exceptionally well in emergency medicine and prevention of death, in cases of chronic heart failure, chronic kidney disease, diabetes mellitus, osteoarthritis, etc., do very little in terms of quality of health.

There is an urgent need for medical technologies designed for the effective repair of injured cells, organs and systems of the human body. As the study of the global burden of disease suggests, this universal challenge is not solvable by increasing spending on the same paradigm of medical care. A conceptual shift is required to develop medical technologies that promote physiological health.

FOUNDATION FOR REGENERATIVE MEDICINE

We propose that therapeutic technologies that enhance quality of health should follow the same fundamental principles that underpin the organisation of life at all levels. A number of such principles have been formulated, for example see Capra and Luisi (Capra and Luisi 2014). For the purposes of this article we use a simple and self-evident approach to describe these principles and show how they could form a foundation for supportive regenerative technologies.

Principle 1. Regeneration

By looking at gradually disappearing skin cuts we can easily see that our body heals itself through regeneration, an inherent ability of all living organisms to self-renew (Carlson 2007). Consider a single living cell. Every moment it faces the threat of disintegration. To counteract that threat and to maintain internal order, the cell absorbs energy and matter from the environment and completely rebuilds itself. A cardiomyocyte, for example, replaces nearly all its molecules in about two weeks. In a similar but much slower way, a multicellular organism recreates itself via cellular regeneration (maintenance regeneration). When conditions change, the body also changes by rebuilding itself in an adjusted form (adaptation). And if trauma or disease has damaged the body, it starts to mend the affected tissues (injury induced regeneration).

The human body has a relatively limited capacity to self-repair, and although regeneration is initiated after injury or disease, this frequently results in forming a scar instead of normal functioning tissue. Therefore, a technology that supports physiological health must be aimed at overcoming deficiencies of regeneration.

It is important to note that attempts to gain direct control of the body's regenerative ability by using injections of stem cells, or induction of regeneration by biologically active molecules and various genetic methods have not produced an effective solution. Despite colossal research efforts and some 2500 clinical trials, the mechanistic regenerative technologies are far away from routinely restoring tissue after trauma or disease (Badylak and Rosenthal 2017).

Principle 2. Self-sufficiency

In nature an organism can flourish only if it is self-sufficient and self-sustaining in the context of its environment. In human society it is also a common wisdom that the only way truly to help anyone is to help them to help themselves. This implies that a regenerative technology should support the natural ability of the body to self-repair, rather than attempting to replace it. Artificial substitution as a medical intervention may be a last resort or a palliative option, but it is never a sound long term

treatment strategy because it leads to weakness, development of dependency and finally to further degeneration.

Since the ability to self-regenerate is inherent in the existence of all organisms, we need to ask the question – why is it so different even among humans? Why do some people fall ill when exposed to a certain stress, while others do just fine? Why do some people recover from an infectious disease such COVID-19 in a matter of days, while others become severely ill?

One way to describe these differences is to consider the aspect known as functional reserve, the extent to which the function of a cell, organ or whole organism can be intensified in response to a stressor, without going into pathological dysfunction. We experience high functional reserve when we do not get sick, even in the most challenging situations. For example, elite cyclists can sustain a five-fold(!) increase in metabolic rates during a race without ending up in hospital. On the other hand, a person with low functional reserves may fall ill even after a 5-minute walk. In these circumstances the overall resilience and vitality of the person are decreased, the course of the illness may be extended, with multiple complications such as non-healing wounds, weakened immunity and numerous degenerative changes.

Generally speaking, there are four closely interrelated aspects that may decrease functional reserve (Kurzanov et al. 2016):

- Lack of energy - cells and organs do not have power to function;
- Sluggish metabolism - supply of nutrients, synthesis of new molecular building blocks and removal of waste are too slow in a cell;
- Disregulation - conflicting signals interfere with regulation of flows of energy and matter;
- Lack of positive intent - a person who is severely ill often feels despair and gives up on helping himself or herself.

We used this fourfold framework to demonstrate, for example, why SARS-CoV-2 infections develop along remarkably different trajectories: from completely asymptomatic to a severe course of disease (Surazakov et al. 2020). Furthermore, it is important to note that these deficiencies of functional reserve are not limited only to certain specific conditions. Instead, they are a common denominator of practically all pathologies, stress, failed adaptation and aging (Seppet *et al.* 2009, McCance and Huether 2014).

Principle 3. Evolution

Life is a gentle, natural process of evolution. Even though stress and injury often follow radical and sudden changes, growth, adaptation and healing always proceed at a gradual, step-by-step pace of removal of old or damaged tissue and replacement with newly synthesised structures. Therefore, by evolution we refer not only to changes in heritable characteristics of biological populations but to a broader concept of enhancement of quality of life through the accumulation of small incremental changes.

The implication of this fundamental principle is that natural regeneration cannot be forced by the same high-intensity interventions of fighting against causes of cell injury. A regenerative technology has to be of a supportive, non-invasive quality that is fully compatible with the natural evolutionary process.

Indeed, during the second half of the 20th century research into on a number of low-intensity and non-destructive biophysical stimuli such as laser, colour light, ultrasound and magnetic field showed great promise in regenerative medicine. By 2014 over 3500 research reports and hundreds of clinical trials had been published in the English language on laser therapy alone (Hode and Tunér 2014). Overall, clinical practice has confirmed that when these radiances are carefully tuned to provide a non-

damaging and supportive stimulus the treated cells and organs demonstrate an enhanced ability to regenerate (Kartelishev et al. 2012; Konchugova et al. 2014; Abrahamse and Hamblin 2017).

Principle 4. Interconnectedness

Life is fully interrelated, interactive and therefore completely interdependent. All the elements in a human body are so tightly interconnected that in essence the organism exists and acts as one coherent whole. Therefore, it will be correct to say that any biological function, including regeneration, is the sum total of the cooperative activity of an ensemble composed of a large number of individual elements (molecules, cells, organs). These ensembles in living organisms are held together by cooperative and synergistic relationships. But when a very large number of elements interact, the degree of coherency in their actions becomes of paramount importance.

In physics coherence represents the degree of synchronicity between oscillations of different objects or processes. During the last two decades a number of physicists have laid out the theoretical foundation for the "coherent state of living tissue" (Bischof and Del Giudice 2013). The significance of this concept is that from a biophysics point of view, biological efficiency depends on how individual microscopic processes combine into complex macroscopic effects. In the absence of coherence, elements spend their available energy on random movements, leaving little to no energy for their external joint work. The onset of coherence eliminates the "useless" motions, thus freeing energy towards external work. Coherence, therefore, is a natural result of cooperation in an ensemble, owing to its overall energy advantage.

Coherence can be used to enhance function in chemical and biophysical systems (Scholes et al. 2017). And here lies the opportunity for a medical technology that is completely noninvasive and, at the same time, fully supportive of the natural regenerative process. We can increase coherence of living tissue by using external sources of vibration. And since the functional reserve of a cell depends on energy, matter and regulation at the same time, in coMra therapy we use a coherent combination of low intensity radiances to increase the functional reserve of a cell, by raising the efficiency of the four key aspects of functional reserve (Surazakov et al. 2020):

- Near infrared laser and magnetic field induce a state of quantum coherence that leads to more efficient energy metabolism, the capacity of a cell to produce enough ATP under unfavourable conditions of hypoxia, impaired mitochondria, toxic load or elevated cell function;
- Ultrasound induces a state of coherent mechanical vibration that leads to enhanced molecular transport, thus accelerating repair of cell and tissue;
- Colour sequencing, generated with LEDs, produces a coherent sequence of messages that corresponds to the regenerative regulation.
- The safe and effective technology available for use at home creates an opportunity for transforming a passive recipient of complex and expensive medical procedures into an active builder of one's own health.

Principle 5. Intelligence

How do we distinguish a brick or a robot from a turtle or a human being? One way to answer this question is: self-organisation via self-regeneration from within (Capra and Luisi 2014). So when we describe life, inevitably we come to an intelligent self that is responsible for "its own making".

We define the term "intelligence" from its Latin roots *inter* + *legere* meaning the ability to "choose between". In its basic form it is the ability of a living organism to discriminate between that which is

harmful and that which is beneficial and to act accordingly. For example, a cell cannot survive without an ability to identify and absorb nutrients, to expel waste, avoid toxins and move away from danger, towards safety. Naturally, this cellular intelligence lies not within the realms of economics, literature or politics, but in the skilled handling of molecules in order to build itself from the inside, extracting and prudently using energy and communicating with other cells in order to cooperate in large groups in the form of tissue, organs or a whole organism. Consequently, the intelligence of the body is a form of collective intelligence of the whole community of cells.

The most important implication of intelligent self-organisation is that the main actor in regenerative medicine is the organism itself that chooses and enacts a response to an injury or disease.

Note that within the boundaries of mechanistic medicine the organising self is temporarily negated because medical intervention is performed by a physician. The patient's body is a passive recipient of a procedure that has a very specific effect on the target process – anti-inflammatory, immunosuppressive, anti-thrombotic, etc.

In a regenerative technology such as coMra therapy, the aim is to support the inherent regenerative ability of the body; the sum total of all self-repair processes carried out by the body in response to injury or disease. This aim is realised by addressing the reduced functional reserves that exist under conditions of high load and/or cellular injury in terms of energy supply, molecular transport and regulation. In other words, the aim of coMra therapy is not a disease-causing agent, pathological process or a symptom, but rather the capacity of a cell to self-repair. For this reason, coMra therapy can be used to support the body's self-repairing ability in practically any pathological state, as well as for supporting general well-being and quality of life.

The beneficial effects of coMra therapy follow the natural stages in healing and recovery. The coMra enhanced regenerative process is first of all manifested as restoration of energy supply within a cell. Symptomatically there is a feeling of relief of acute pain and an increased sense of wellbeing within minutes and hours after a coMra treatment. Once life-sustaining energy-dependent processes are restored in cells, tissue as a whole is able to resume its earlier, suppressed, tissue specific function, such as digestion, muscle contraction, immune function, hormone secretion, etc. Finally, as functionality of individual organs is at least partially restored, modulation of the activity of the central nervous system and the immune and endocrine organs occurs, by shifting the organism from states of acute stress or depletion towards the more physiologically adequate states that are most conducive to the process of healing.

For over 10 years we at Radiant Life Technologies have been introducing coMra therapy to people with a wide variety of different diseases, covering all ages and with the severity of their conditions ranging from minor aches to the most serious illnesses. And the natural outcome of this shift to quality of life is the gradual gaining in confidence in one's ability to handle health challenges and a sense of profound well-being. Once there is a realization that we are indeed in charge of our own health, we also learn how to correct not only physiological but also psychological and life style imbalances that lead to diseases in the first place.

CONCLUSION

Our vision for holistic regenerative medicine is one of intelligent cooperation with life. The vision becomes reality once the fundamental principles of life are used as guidelines for creating life-supportive technological solutions, conducting research and supporting every individual in becoming self-sufficient.

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