What is healing energy? Part 4: vibrational medicines

J. L. Oschman

Abstract Vibrational medicines involve the therapeutic application of fluctuating energy fields, whether projected from the hands of therapists, from electronic devices, lasers, the human voice or musical instruments, or from homeopathic, aromatherapy, herbal or other kinds of preparations. At a basic level, virtually all that we know about living systems is based on the analysis of vibrations. Vital regulatory systems in the body are associated with a variety of molecular electromagnetic emissions and absorptions. In many cells and tissues, molecules are arranged arrays resembling crystals. Because of this, molecular oscillations are organized and coherent. Molecular oscillations are absorbed by the living matrix (connective tissues, cytoskeletons and nuclear matrices) and conducted throughout the body. All forms of bodywork and movement therapy interact with this energy continuum in one way or another. Coherent molecular oscillations give rise to collective properties such as great sensitivity to environmental fields and radiation of energy from the body into the environment. Part B discusses how dynamic energy systems are influenced by homeopathy, aromatherapy, herbs, light and sound stimulation, and related vibratory methods.

James L. Oschman PhD
Nature's Own Research Association,
PO Box 5101, Dover, NH 03821, USA

Correspondence to: J. L. Oschman,
Tel: ++1 603 742 3789; Fax: ++1 603 742 2595;
E-mail: JOschman@aol.com

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Introduction

Vibrations underlie virtually every aspect of nature. The vibrations of atoms create sound and heat. Light arises from the vibrations of electrons in an object. When we say something is blue, what is really happening is that light has made the electrons within the object vibrate in a way that

causes the emission of blue light (see Weisskopf's (1968) article on how light interacts with matter). At a basic level, all life depends upon molecules interacting through vibrating or oscillating energy fields. Virtually all that we know about living systems is based on the analysis of vibrations.

In the living body, each electron, atom, chemical bond, molecule, cell, tissue, organ and the body as a whole has its own vibratory character. Since living structure and function are orderly, biological oscillations are organized in meaningful ways, and they contribute information to a dynamic vibratory network that extends throughout the body and into the space around it. 'Energy medicines' and 'vibrational medicines' seek to understand this continuous energetic matrix, and to interact with it to facilitate healing (Gerber 1988).

The science of vibrations applies to all clinical methods. Regardless of the philosophy of the technique being used, intricate energetic interactions occur between nearby individuals, even if they are not in physical contact. Seeing and talking with another person are energetic interactions, involving light and sound vibrations. Information can be transferred from one organism to another via energy fields, and living systems are very sensitive to them. Add therapeutic intention and touch to the equation, and whole new dimensions of subtle but measurable exchanges are brought into play.

Sceptics lump vibrational medicines together as mystical, supernatural, occult, pseudoscience or, simply, unbelievable (e.g. Barrett & Jarvis 1993, Raso 1996). The dynamic energy systems of the body are dismissed as involving 'subtle energies that are alien to physics'. These critiques are out of date, as modern researchers have confirmed that living organisms are, indeed, comprised of dynamic energy systems involving the same sorts of field phenomena that physicists have been studying for a long time. For example, clinical medicine is beginning to employ oscillating magnetic fields to 'jump start' healing. Vibrational therapies are not magic or superstition: they are based on biology, chemistry and physics.

Vibrational biophysics

Vibrations are a fundamental part of physics. There is a wide spectrum of electromagnetic vibratory frequencies, covering some 90 octaves. Any therapeutic interaction, whether it uses sound, heat, laser beams, herbs, aromas or movements, involves one or more portions of this energy spectrum.

We have already discussed the extremely low frequencies (ELF) of the brain and heart, and their interactions with geophysical rhythms. Higher frequencies include radio, television, microwaves, infrared, visible light, ultraviolet, X-rays and gamma rays. For each of these frequencies, vibratory energy comes in discrete packets or quanta, called photons: the higher the frequency of vibration, the more energy per packet. Physicists often refer to all electromagnetic phenomena as 'light' and to their units as 'photons' even though only a small part of the spectrum can be detected with the eye. Biological systems respond in different ways to different parts of the electromagnetic spectrum.

Molecules wiggle

Molecules orchestrate all living processes. Every event taking place within the body involves molecules performing tasks on other molecules. Regardless of technique or philosophy, all healing affects molecules.

No one has ever seen a molecule; they are simply too small. Even the most powerful microscopes give us only a fuzzy outline of molecular shape. In spite of this, we have a detailed knowledge of how molecules are constructed and carry out their functions. How can this be so?

Molecules are composed of atoms, which are made up of electrons. Virtually all of our knowledge about molecules, and about matter in general, has come from studying the ways light interacts with electrons.

Natural frequencies, entrainment, resonance

Previous articles in this series discuss how oscillating electric and magnetic fields, such as those produced by the heart and brain of two individuals, can become coupled or entrained, either through direct touch (electrical connection) or through biomagnetic interactions, or both. We also mentioned important therapeutic applications of entrainment.

Any object has a certain natural or resonant frequency. Strike it, bump it, pluck it, or heat it, and it will tend to vibrate at a specific frequency. This applies to a bone, a piece of wood, a molecule, an electron or a musical instrument.

When two objects have similar natural frequencies, they can interact without touching; their vibrations can become coupled or entrained. For electromagnetic interactions between molecules, the word 'resonance' is used more often than entrainment. In the older literature you will find the term 'sympathetic vibrations.'

In terms of vibrations, the human body can be compared to a symphony orchestra. Each molecule corresponds to a particular instrument. Each bend, rotation or stretch of a chemical bond has a certain resonant frequency, and will give off certain 'notes' if it is energized. Since molecules, water and dissolved ions are constantly bumping into each other at body temperature (Fig. 1), all parts are constantly jiggling and absorbing and emitting energy.

Molecules and energy

While a chemical process, such as the breaking of a bond, may look

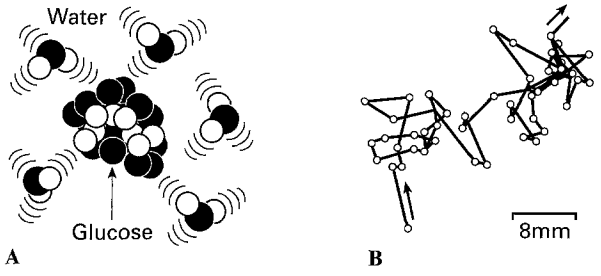

Fig. 1 (A) A sugar molecule (glucose) magnified 30 000 000 times, showing how it is jostled by the water molecules around it, drawn at about the same scale. The molecules are represented as 'space-filling' models, in which each atom is drawn as a sphere centred on the nucleus. Each sphere encloses a cloud of electrons. Space-filling models are useful because they show the effective size of the molecule, i.e. the approximate boundary through which other atoms cannot penetrate. (B) At body temperature, a sugar molecule travels more than 3 metres per second, but it does not get far inside a cell because it keeps bumping into water and the other molecules around it. The jagged line represents the path taken by a single glucose molecule in a fraction of a second. The glucose molecule is from Goodsell DS 1993. The Machinery of Life. Springer-Verlag, New York, Figure 1.5c, p. 9.

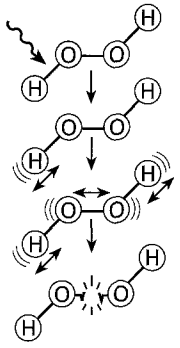

Fig. 2 Molecular surgery, in which the O–O bond of hydrogen peroxide, H_2O_2, is broken apart by a specific frequency of laser light. The squiggly arrow represents a photon of light that energizes the O–H bond, i.e. it makes it vibrate violently. The vibrations are rapidly redistributed throughout the molecule, and the O–O bond, which is weaker than the O–H bond, breaks. The experiment was done by Fleming and Crim of the University of Wisconsin (see Crim 1990). The diagram is modified from Ball 1994 Designing the Molecular World Princeton University Press, Princeton, NJ, Figure 3.19, p. 109.

superficially like a mechanical event, at a deeper level the event is better described as a series of vibratory interactions. This is the level at which the various 'energy therapies' have their effects.

A soprano shatters a crystal goblet by singing a high note coinciding with the natural frequency of the goblet. The atoms in the glass vibrate so strongly that they cannot hold together, and the goblet breaks. The same thing can happen to a molecule. Figure 2 shows a molecule of hydrogen peroxide, H_2O_2, being fractured by vibrations. Sometimes this is called 'molecular surgery.'

The O–O bond of hydrogen peroxide is broken selectively with an electromagnetic field of a specific frequency. The squiggly arrow in the drawing represents a photon of laser light that energizes the O–H bond, i.e. it makes the bond vibrate violently, just as a tuning fork vibrates when you strike it. The vibrations are rapidly redistributed throughout the molecule, and the O–O bond, which is weaker than the O–H bond, breaks.

'Molecular surgery' of this kind is important to bodywork because it provides a biophysical basis for controversial vibrational therapies in which toxins, such as agent orange or DDT, which have been stored in the body, can be broken apart by energy fields emitted by crystals. When such a complex molecule is 'shattered' by vibrations, its fragments can be detoxified and excreted from the body.

Ball-and-stick images of molecules such as the one shown in Fig. 2 create the false impression that the atoms within a molecule are fixed in position. Actually, such drawings show the average structure. In real life, molecules change their shapes extremely rapidly, with time intervals measured in trillionths of a second.

Figure 3 shows the basic unit of the protein backbone, called a peptide group. These units are repeated again and again to create proteins of various sizes, shapes and functions. The carbon–nitrogen bond of the peptide group is rigid, while the adjacent bonds are essentially free to rotate (Pauling 1960). This is important because it explains the flexibility of the protein backbone, which enables proteins to assume different shapes as they carry out their functions.

Computer simulation is used to determine how proteins fold and twist as they perform their functions. The bonds between the atoms are treated as though they are springs. High-speed computers determine the forces acting on the parts. Beginning with the average 'ball-and-stick' structure, the computer calculates the bends and twists taking place from instant to instant as a result of the jiggling of surrounding molecules (see inset, Fig. 3).

An example of computer simulation is given in Fig. 4, which shows an important enzyme in the nervous system, acetylcholinesterase. The computer reveals the dynamics of both the structure and the energy field of the protein as it is carrying out its function. Images such as this are important for vibrational medicine, as they depict the dynamic interplay between molecular structure and energy fields. Details are in the figure legend.

Spectroscopy

The most important source of information on molecular behaviour is spectroscopy, which is based on the ability of molecules to absorb and emit electromagnetic fields. For a listing of books and review articles on this important subject, see Sauer (1995). Spectroscopy is possible because of the resonant interactions taking place in molecules.

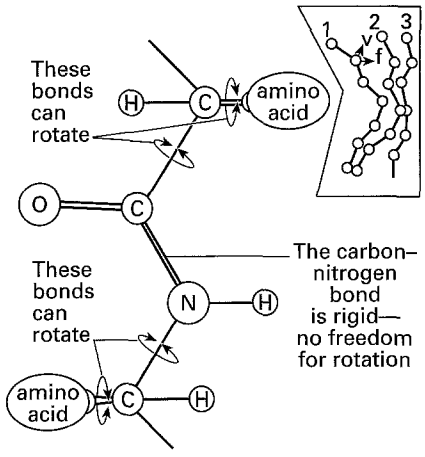

Fig. 3 The basic unit of the protein backbone, the peptide group. These units are repeated again and again to create proteins of various sizes, shapes and functions. The C–N bond of the peptide group is rigid, while the adjacent bonds can rotate (see Pauling 1960). Bending and rotation of these bonds allow the protein backbone to assume different shapes. The inset shows three successive shapes of a protein segment, as determined by molecular-dynamics simulation, at 10^{-15}-second intervals. The computer determines shape changes on the basis of forces (f) and velocities (v) created by interactions with surrounding molecules. The inset is redrawn from Karplus & McCammon 1986 The dynamics of proteins. Scientific American 254, p. 45.

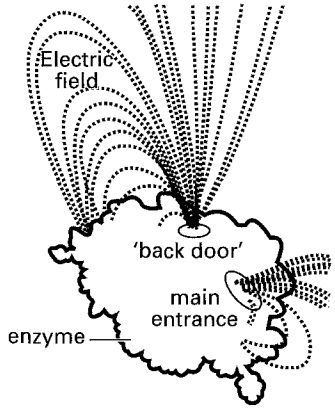

Fig. 4 An important enzyme, acetylcholinesterase, has been studied by computer simulation. The enzyme breaks down the neurotransmitter, acetylcholine, which is released at certain synapses, such as those causing muscle contraction. The structure of the enzyme determined by X-ray diffraction did not explain how the molecule allows acetylcholine into the 'active site' deep inside the enzyme. Computer molecular dynamic simulations by Gilson et al (1994) revealed that the enzyme has a 'back door' with an electric field that attracts acetylcholine into the active site, and then allows the products of the reaction, choline and acetate, to escape. The illustration is redrawn from the cover of Science, Volume 263, 4 March, 1994.

A molecule contains various charged components: protons, electrons and side groups such as the amino acids shown in Fig. 3. Each of these charges has an electric field around it. When a charge moves or rotates, the electric field moves or rotates, and this sets up electromagnetic fields that are radiated into the environment. The opposite is also true: specific frequencies in the environment can be absorbed by a molecule, inducing movements of the component parts.

A substance such as water, appearing colourless to the eye, absorbs strongly at a variety of frequencies that we cannot see. We shall see below how such absorptions are involved in homeopathic and related vibrational medicines.

Different kinds of motions taking place within molecules result in the emission or absorption of different types of energy fields:

> The highest frequency and highest energy motions are those of the innermost electrons, which resonate in the X-ray region of the electromagnetic spectrum. The outermost electrons, responsible for most of the physical and chemical properties of an atom, resonate at the ultraviolet and visible portions of the spectrum. Bond bending and stretching involves infrared light. Bond rotations resonate at microwave frequencies. In a microwave oven, an electromagnetic field tuned to one of the natural frequencies of water makes the water molecules rotate strongly in one direction and then the other. This vibratory energy is transferred to the other atoms in the food, and heats them. The spins and orientations of atomic nuclei correspond to vibrations in the radiofrequency and sound portions of the spectrum. Usually the frequencies absorbed by a molecule are identical with the frequencies emitted when the molecule is excited. Energy is absorbed by the reverse of the process by which emissions are produced, i.e. the absorbed energy causes particular motions to be set up within the molecule. (Whiffen 1966)

Spectrometers of various kinds are used to measure the emissions and absorptions of molecules. Technically the radiation or absorption pattern is called a spectrum (a graph of energy intensity versus frequency or wavelength). Figure 5 shows a typical infrared absorption spectrum of a compound. Each peak represents a frequency that is absorbed by bending or stretching of a particular bond within the molecule.

Every molecule in the body, and every homeopathic, herbal or aromatherapy preparation, vibrates in specific ways and emits a characteristic energy spectrum. Complex molecules contain thousands or even millions of atoms, and their spectra can be quite intricate. The spectrum is an electromagnetic 'signature' or 'fingerprint' of a molecule that is an extremely precise representation of the motions of the particles within it. So characteristic are these fingerprints that a chemist can use them to identify an unknown substance.

Vibratory interactions between molecules

Figure 6 shows a resonant interaction between two nearby proteins. The rotation of a charged amino acid sets up an electromagnetic field that entrains rotations of the corresponding amino acid on a second protein. The second protein also emits an electromagnetic field that affects other proteins. As a result, molecular motions and energy fields join together to form a continuous or collective energy system. We shall see below that the crystal-like organization of molecules in living systems enhances this phenomenon.

Living crystals

All therapeutic and scientific approaches to the body can benefit from an appreciation of the crystalline

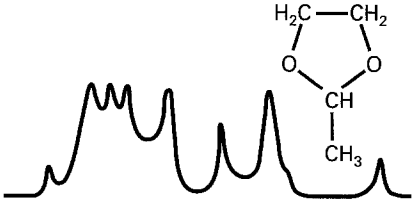

Fig. 5 The infrared absorption spectrum of 2-methyl dioxalane, and its molecular structure. Modified from Whiffen DH 1966 Spectroscopy, John Wiley and Sons, Inc, Fig. 8.2a, p. 102.

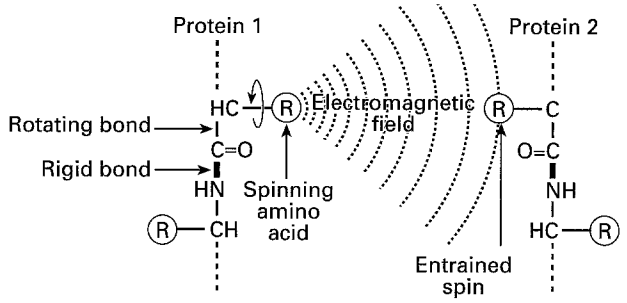

Fig. 6 The rotations of a charged portion of the protein molecule on the left set up an electromagnetic field that brings about complementary motions in the protein to the right, even though the two molecules are not touching. It is the oscillating electric component of the electromagnetic field that makes the amino acid of protein 2 oscillate in synchrony with the corresponding amino acid of protein 1. For details, see Molecular Vib-rotors, by Allen & Cross 1963 and Sauer 1995.

nature of living tissues. We do not usually consider our bodies to be crystalline, because when we think of crystals we usually think of hard materials, like diamond or agate. Living crystals are composed of long, thin, pliable molecules, and are soft and flexible. To be more precise, these are liquid crystals (e.g. Bouligand 1978).

Crystalline arrangements are the rule and not the exception in living systems. Examples include arrays of phospholipid molecules forming cell membranes and myelin sheathes of nerves, collagen arrays forming connective tissue, contractile arrays in muscle, arrays of sensory elements in the eye, nose and ear, arrays of microtubules, microfilaments and other fibrous components of the cytoskeleton in nerves and other kinds of cells, and arrays of chlorophyll molecules in a leaf.

Some bodyworkers are convinced that crystalline materials, such as quartz, shells and stones, enhance the effectiveness of their work (e.g. Jeffery 1993, Galde 1991). A simple explanation for such effects is that crystalline objects have resonant interactions with the highly ordered liquid crystals within the tissues of the therapist and the person they are touching. In other words, the crystals enhance vibratory energy exchanges between two individuals.

Coherence

Because of the resonant interactions illustrated in Fig. 6, nearby molecules interact with each other via electromagnetic fields. What happens in an extensive array of similar molecules, such as those mentioned above?

Answering this question has led to one of the most important discoveries in recent years, a discovery that can help account for many of the remarkable phenomena experienced every day by practitioners of vibrational medicines.

We have repeatedly mentioned the work of Herbert Fröhlich, who predicted that crystalline molecular arrays should vibrate strongly and coherently. For an entertaining account of coherence and its biological significance, see *The Rainbow and the Worm* by Ho (1993).

Fröhlich was particularly impressed with the effects of the enormous electrical fields developed across cell membranes, with the inside negative relative to the outside. Electrical fields are also generated in the collagen arrays in connective tissues (tendons, ligaments, bones, cartilage, fascia) during movements. Activities such as nerve conduction, muscle contraction and glandular secretion also produce electrical fields. Each activity in the body creates a characteristic field pattern. Moreover, the whole body is polarized, with the head-end negative and the tail- or foot-end positive (Athenstaedt 1974).

Research on electrically polarized molecular arrays reveals that interactions such as those shown in Fig. 6, repeated by the millions of molecules within a cell membrane, tendon, muscle, bone, nerve cell or other structure, give rise to huge coherent or laser-like vibrations. The vibrations are collective or cooperative phenomena, in which all of the weakly vibrating parts, in the presence of an electric field, become coupled. The result is a strong, orderly and stable vibration that is far more than the sum of individual vibrations. This is an example of the tendency for new properties to arise as we go up the ladder of scale, eloquently described by Szent-Györgyi (1963):

> If Nature puts two things together she produces something new with new qualities, which cannot be expressed in terms of qualities of the components. When going from electrons and protons to atoms, from here to molecules, molecular aggregates, etc., up to the cell or the whole animal, at every level we find something new, a new breathtaking vista. Whenever we separate two things, we lose something, something which may have been the most essential feature.

Bodywork and movement therapies focus primarily on the 'something new' or 'breathtaking vistas' arising in the body as a consequence of the ways the parts cooperate. In the past science has been based on separating parts for individual study, which obviously eliminates some of the most interesting properties. Whenever a

scientist, such as Fröhlich or Szent-Györgyi, has looked for the cooperative qualities arising from the ways living molecules interact, profoundly important discoveries have emerged.

In the case of Fröhlich oscillations, two 'new qualities' arise that are of great importance in the therapeutic setting. One is that the crystalline molecular arrays found throughout the body are exceedingly sensitive to energy fields in the environment. Some of these sensitivities border on the limits of what is physically possible. Biologists continue to find such sensitivities, but the phenomena have often been dismissed as impossible. Fröhlich's research has provided a physical mechanism for such sensitivities.

The second new quality is that strong oscillations can travel about within the crystalline network of the body and they can be radiated into the environment. Theory predicted that the vibrations would occur at a variety of frequencies, including visible and near visible light. Such radiations have been detected (e.g. Callahan 1975, Popp et al 1981, 1992). Moreover, it has also been demonstrated that such frequencies have important biological effects (e.g. Grundler Keilmann & Fröhlich 1977).

Crystalline components of the living matrix act as coherent molecular 'antennas,' radiating and receiving signals. Electronics engineers know that an antenna works best if its length corresponds to the wavelength of the signal being transmitted or received. When a person moves, tensions set up within the fabric of the body change the lengths of the molecular antennas of the myofascial system, and therefore change their resonant frequencies. Experienced bodywork and movement therapists become sensitive to such changes, and use the information to 'tune in' to imbalanced or immobile places within the bodies of their clients.

Research on coherence in biological systems is attracting much attention around the world. One important conclusion is that the water in the spaces between parts of the highly ordered systems is also highly organized. Vibrations of the water molecules can couple to the coherent energy patterns within the protein array. The resulting coherent water system has laser-like properties, and is likely to retain and release electromagnetic information, i.e. have a form of memory (Del Giudice et al 1988, Preparata 1995).

Cellular oscillations and systemic regulations

Now we consider vibrating molecules in the context of whole body or systemic regulations, the focus of many bodywork and movement therapies. Figure 7 shows all of the physiological processes in the body, without their names. All the systems are interlinked by a great number of interacting and crisscrossed pathways (Adolph 1979). Systemic or global or 'whole system' regulation refers to the sum of all of these communicating pathways interacting and integrating to produce coordinated actions, such as metabolism, movement, thought, excretion, reproduction, defence against disease, wound repair, etc. All schools of bodywork or movement therapy represent different approaches to these regulatory networks.

From the complexity shown in Fig. 7, we extract a single physiological regulatory loop affecting a single cell (Fig. 8). In making this separation, we keep in mind the intricately crisscrossed pathways that operate in the background, affecting every step.

The conventional linear way of viewing this scheme is that a stimulus or disturbance to the system initiates a cascade of events that eventually activate a receptor on the surface of a particular cell. Another cascade of events within the cell leads to a certain activity.

An important discovery in relation to this scheme is the existence of 'second messengers' within cells (e.g. Rasmussen 1981). These are substances that convert a 'first message', such as a hormone, neurotransmitter, growth factor or other command signal arriving at the cell surface, into a change in some activity inside the cell or nucleus. These events lead to an 'action' that

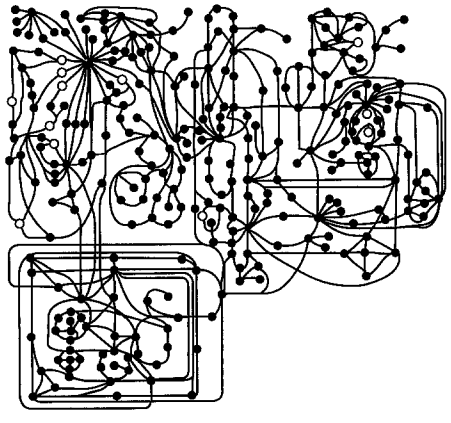

Fig. 7 All of the physiological processes in the body are shown without their names. 'The biology of wholeness is the study of the body as an integrated, coordinated, successful system. No parts or properties are uncorrelated, all are demonstrably interlinked. And the links are not single chains, but a great number of crisscrossed pathways. All of the systems interdigitate. This is possible because of communication.' (Adolph 1982). The illustration is redrawn from Mellor DJ 1966 A physiological integration. Drug Houses of Australia Ltd, Medical Division, PO Box 4746, Melbourne, Victoria 3000, Australia.

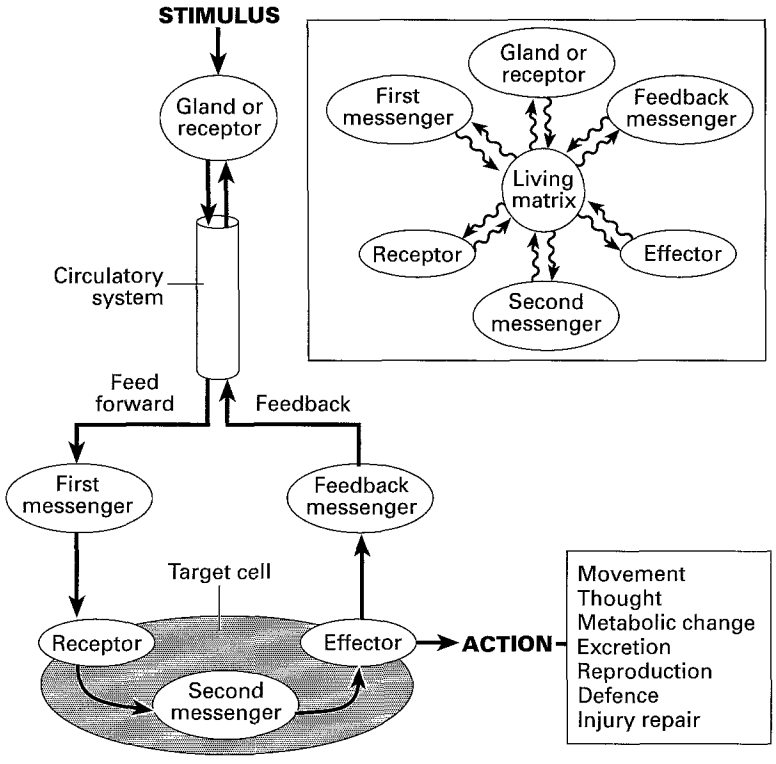

Fig. 8 A single regulatory loop is separated out from the web of physiological interactions shown in Fig. 7. A stimulus or disturbance to the system (technically called a perturbation) affects a gland or sensor. This results in the release of a messenger (hormone, signal molecule or growth factor) into the circulatory system. The messenger travels to a target cell, where it activates a receptor in the cell membrane. This activates one or more second messengers within the cell that activate an effector (contractile array, secretory system, etc.) causing some action to take place. Feedback is obligatory, as information that an action has taken place always flows back to the beginning of the cycle (Adolph 1979). The feedback messenger enters the circulatory system, and is carried back to the gland or receptor that initiated the cycle. The inset shows that each molecule in the loop emits and absorbs electromagnetic signals (photons, shown as squiggles) as it carries out its function. These signals can be absorbed and conducted throughout the organism by the continuous living matrix (the connective tissues, cytoskeletons, nuclear matrices, and water associated with them). Some of the components of the loop may be partly or entirely electromagnetic in character. Allergies, chronic and degenerative diseases and failure to heal can result from the disruption of such regulatory loops. We can view the loop as a cascade of chemical reactions accompanied by a cascade of electronic and electromagnetic interactions.

tends to bring the whole system back to balance. A series of signals then feeds back to the first step in the loop, providing information that the action has been completed.

Pharmacology is based on the concept that if we understand a regulatory pathway, we can selectively intervene with drugs that stimulate or block specific steps in the chain. There is more to the story, for each part of the sequence involves a molecule with a unique structure and with a unique pattern of energy emission and absorption. Internal motions of each molecule enable it to carry out its function, e.g. as a hormone, receptor, second messenger or enzyme. A spectrum of different frequencies will be given off while a molecule is coiling or twisting to carry out its task, and a corresponding set of frequencies can be applied to a molecule that will enhance or inhibit the internal motions involved in the molecule's functioning.

For example, a hormone–receptor interaction or an antibody–antigen reaction is often viewed as a mechanical lock-and-key system, in which only one specific type of molecule can fit into the receptor. While the analogy is useful, there is more to the story of how one molecule recognizes and responds to another. At the atomic scale, physical contact between two molecules has less meaning than the ways they interact energetically. As a hormone approaches a receptor, the electronic structures of both molecules begin to change. Bonds bend, twist and stretch; parts rotate and wiggle. The orientation and shape of the molecules change so that the active site of the hormone can approach the active site of the receptor. Recognition of a specific hormone by a receptor depends on resonant vibratory interactions, comparable to the interactions of tuning forks.

Fröhlich (1975) developed a model in which strong attractions arise because of giant coherent oscillations of the two molecules involved. The appropriate frequency for such attractions is around 10^{13} Hz, which corresponds closely to the frequency of cell membrane electrical oscillations at body temperature.

Activation of the receptor is the final step in an elaborate energetic dance of the electrons within the two molecules. This electronic 'ballet' is an example of molecules interacting without touching. As the electronic structure of hormone and receptor changes, photons are emitted and absorbed. Such emissions and adsorptions were once thought to be random events – unimportant byproducts of biochemical processes; scientists now see them as vital pieces of information.

The inset in Fig. 8 shows some of the photons being given off and absorbed by molecules as they perform their functions in a regulatory loop. The information arising from such energetic exchanges is not wasted. Instead, information is exchanged with the living matrix continuum. This is the continuous network composed of connective

tissues, cytoskeletons and nuclear matrices, and the continuous layers of water adhering to them. Since the living matrix extends into every nook and cranny of the body, it forms a systemic energetic continuum. The overall field of the body, and fields in the environment, affect all of the steps in the regulatory loop.

Hence the electromagnetic 'environment' of a hormone–receptor interaction influences and is modified by the interaction. In some cases, triggering a receptor with an appropriate electromagenetic field is indistinguishable from triggering it with a hormone or other stimulus.

Some regulatory loops may be partly or entirely electromagnetic in character. Fröhlich (1978) explains:

> An assembly of cells, as in a tissue or organ, will have certain collective frequencies that regulate important processes, such as cell division. Normally these control frequencies will be very stable. If, for some reason, a cell shifts its frequency, entraining signals from neighboring cells will tend to reinstall the correct frequency. However, if a sufficient number of cells get out-of-step, the strength of the system's collective vibrations can decrease to the point where stability is lost. Loss of coherence can lead to disease or disorder.

While pathology may manifest as chemical imbalances, the underlying problem is electromagnetic. Hence balance can often be restored by providing the correct or 'healthy' frequency, and entraining the oscillations back to coherence.

These are profoundly significant concepts for all therapeutic approaches to the body. The whole field of chemical analysis by spectroscopy shows that there is a 'fundamental duality between chemical structure and coherent oscillations'. Coherent vibrations in living systems are as fundamental as chemical bonds (Smith 1994).

There are two ways of altering functions in the body: one is to add particular molecules to the system, and the other is to add the electromagnetic signature of those molecules. The energy fields projected from the hands of bodyworkers are in the range of intensity and frequency that can influence regulatory processes within the body of another person.

Energy fields can have profound biological and psychological effects, particularly if they are applied at or near certain active regions on the skin (Andreev et al 1984). Many studies have demonstrated interactions between cells and molecules that are not touching (reviewed by Smith 1994). The most intriguing and clinically significant examples come from research on homeopathy and related vibrational medicines, which we shall consider in the next section.

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ENERGY REVIEW PART 4B

Homeopathy and related vibrational medicines

> What is urgently needed is to be able to read the language of electromagnetic biocommunication to complement our understanding of the genetic code.
> (Smith 1994)

Rationale for vibrational medicines

The rationale behind vibrational medicine is straightforward: diseases and disorders alter the electromagnetic properties of molecules, cells, tissues and organs. In addition to the familiar regulatory systems studied by physiologists, the human body contains an electromagnetic control network. Ancient methods such as acupuncture recognize, understand and treat via these systems. Modern research is determining their biophysical mechanisms and electromagnetic 'languages'.

When a particular molecule is deficient or altered or in excess because of a disease or disorder, normal functioning can sometimes be restored with a drug. This is the basis for pharmacology. Vibrational medicines such as homeopathy demonstrate that similar or even better results can be obtained by providing the electromagnetic fingerprint or signature of a natural substance (Smith 1994). The substance, or its electromagnetic signature, challenges the defence and repair systems to respond, without the side-effects of pharmacological interventions. In some cases an imbalanced system is restored by introducing a signal that cancels a discordant or pathological frequency that is disturbing the body.

In bodywork and movement therapies, the emanations from a therapist's own tissues can provide electromagnetic information that opens or augments vital communications in a patient's tissues. Light and sound therapists apply energies of particular frequencies to appropriate points on the body (e.g. 'colorpuncture', Mandel 1986).

These energetic approaches are not based on vague or obscure theories. For example, studies of energetic phenomena have provided most of the images of atoms and molecules shown in chemistry and biochemistry texts. Spectroscopy is the general field of study, and a series of Nobel prizes speak to its significance. Developments in spectroscopy are closely linked to quantum theory and to our understanding of the fundamental nature of all matter, both animate and inanimate. Astronomers and astrophysicists use spectroscopic methods to determine the composition of stars and other objects that are too far away to allow close-up study.

Medical spectroscopy and the 'water system'

Biomedical scientists are beginning to use spectroscopic methods in the detection and cure of diseases (Jackson & Mantsch 1996). Their results confirm what energy therapists have known for a long time: the human body emits vibratory information that precisely specifies the activities taking place within.

Modern researchers are generally unaware of the extensive background exploration done by the founders of various vibrational medicines, and by those who have carefully and thoughtfully continued these lines of inquiry.

Magnetic resonance imaging (MRI) is a spectroscopic method that is widely and successfully used for medical diagnosis. MRI works because tumours contain abnormal arrangements of water (Damadian 1971, Damadian et al 1974). Most physiologists attach no significance to this important fact, as they do not recognize that the body has a 'water system' involved in communication and regulation. In contrast, homeopathy and other vibrational medicines take advantage of the water system and its great sensitivity to electromagnetic fields.