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Homeopathy and Law of Similars

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Abstract

This paper explains the elementary law of homeopathy, the Law of Similars, on the bases of thermodynamic aspects by means of the chemical thermodynamic. Le Chatelier principle was used,to explain the re-establishment of starting biochemical equilibrium compartmentalized in individual human cells of an ill person consuming the remedy, to clarify the Law of Similars. In addition, the application of the Law of mass action during the re-establishment of the initial equilibrium in an ill person when digesting the remedy exposed the Law of Similars as the strongest outcome of homeopathy.

Keywords: Homeopathy; Biochemical equilibrium; Law of mass action; Law of Similars

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Introduction

Homeopathy in Greek "homeo pathos", is the principle of treating "like cures like"-the phenomenonthat a disease can be cured by a substance that produces similar symptoms in healthy people. This being the primary axiom of homeopathy, often referred to as the "Law of Similars". It dates back to Hippocrates (460-377 BC) and even moreback to the time of mankind's early development and were accepted very early on by the ancients and perhaps even before those times. In other words, this axiom is a phenomenon that has been part of human history from the very beginning and was used in various periods of our development, and continues in a similar form to the present day.

Homeopathy,was first described by Samuel Hahnemann in the late 18th century since when it has remained popular and in its present form, homeopathy has been used all over the world for more than 200 years.

Homeopathy is debatedsince of its routine of very dilute medicines. However, there is a significant body of clinical research, including randomized clinical trials and meta-analyses of such trials, which suggests that homeopathy has actions that are not simply placebo effects [1]. Despite a long history of scientific controversy, homeopathy has shownitstrong and is now widespread in many parts of the world. There is a significant body of scientific evidence with positive results. Certainly, homeopathy is an anomaly that deserves further investigation, as reported by Fisher [1].

On the other hand, when Hahnemann began to employ drugs for curing in homeopathy he found that the normal doses acted much too strongly, and cause great worsening of symptoms before the therapy took place.

He then gradually reduced his amounts until he could get the healing effect without worsening. In some cases, he found that the weakening process really developed and increased the healing powers of the medicine. Therefore, the infinitesimal dose has become the most characteristic feature of homeopathy; however, the word "Homeopathy" itself in no way includes "infinitesimal" in its meaning [2]. The importance of the invention of this method of preparing drugs is very great, scarcely second, in general opinion, to that of the discovery of the Law of similars itself which stays the core of Homeopathy. However, homeopathy never can be separated from a knowledge of the power of the infinitesimal, and never could have been established anything like the perfection and power in which Hahnemann left it, apart from the use of infinitesimals. Hence the widespread association of the two ideas of homeopathy and infinitesimal is fundamentally true, though it may be etymologically faulty as reported by John Henry Clarke [2].

The purpose of this contribution is to explain the Law of Similars on the bases of the natural science while the second Law ofinfinitesimal was not the aim of the present contribution and should be considered elsewhere.

In the literature there is variety of concepts which examine homeopathy. Among them, models centred on the memory of unique water structures are very common [3-11]. This is in addition to: quantum macro entanglement models [12,13], the silica crystals and structures glass-derived concept [14], electromagnetic activities [15], biological signalling [16], the nonlinear dynamics of complex systems [17,18], stressor effects and hormesis [20,21], the biopsychosocial model [22] and a chemical thermodynamics-based model [23,24]. Recently, an extensive and wide-ranging study of Koithan et al. [25] that takes into account many of the theoretical and practical assumptions of earlier works and a comprehensive book by Vithoukas et al. [26] that considers the principles and practical application of homeopathy, were reported.

The Background to theLaw of Similars

When it is possible to establish a medical treatment in which a medicinal product (remedy), that causes the same symptoms of a disease in a healthy person, can heal an illperson, then the only possible explanation for this kind of treatment (in today's understanding of the matter) is the existence of a corresponding biochemical equilibrium. As a rule, all biochemical equilibriaare subjected to abasic thermodynamic principle, the so-called Le Chatelier principle, known in chemistry for nearly a century and thermodynamically well grounded*:*

If a chemical system at equilibrium experiences a change in concentration, temperature or total pressure, the equilibrium will shift in order to minimize that change.

This principle makes it possible to envisage the displacement of any equilibrium in a chemical reaction. However, this principle is much more general and can be extended to all processes where the kinetic equilibrium is the essence of the process. In the light of this thermodynamic principle, biochemical equilibrium will alleviate any disturbance by shifting that equilibrium in the direction that will mitigate it. So, when a disruption (remedy) that exhibits similar symptoms to the original disruption that shifts the equilibrium from the initial equilibrium state to a new one inducing the illness enters this system (human body), then in the light of the Le Chatelier principle, this new biochemical equilibrium will alleviate this disturbance and shift the equilibrium in the direction of the initial equilibrium, which is associated with a healthy state. The remedy that in a healthy person induces same illness symptoms ≡ reaction products represents the disruption to the new equilibrium, which will mitigate this disturbance and shift the new equilibrium to the initial equilibrium associated with a healthy sate. This is the basic thermodynamically grounded mechanism of the healing principle of homeopathy and covers the "Law of Similars".

The processes involving homeopathy occur at the molecular level, compartmentalized in human cells, where the biochemical reactions occur in amechanism that can be labeled as the "Homeopathic Cellular Biochemistry" (HCB).

In the human body, biochemical reactions are taking place in human cells where a huge number of highly sensitive, finely tuned and orchestrated biochemical reactions are going on at any one time in a single cell. Most probable take place in a classic-reductionist way and/or in a structuralist (holistic) way of the energetics of living systems [27,28]. Whatever the thru mechanism governs the biochemical reactions it must be subjected to the basic natural laws. The classic reductionist view (reductionism) is a very powerful analytical approach by which scientists are able to investigate and explain, on the basis of contemporary physics and chemistry, many basic molecular and cellular processes. However, some scientists believe that the biological research has, however, reached a point in which many of the assumptions associated with the molecular-reductionist approach no longer satisfy them. They believed that a more complex holistic approach (a structuralist view of the energetics of living systems) would better explain the biological challenges in the future. The reductionism and holism are in fact interdependent and complementary.

When applying the title model of homeopathy to human body cells the proposed thermodynamic concept must be adjusted with the actual cellular biochemistry. Up to now, the straight forward fitting together between homeopathy and thermodynamics in human cells is not known. For the present we cannot define the explicit mechanism of the homeopathy in whatever view of cellular biochemistry that is going on in human cells. When we consider an over-generalized exampleof Homeopathic Cellular Biochemistry (HCB) *and a*pply the thermodynamic equilibrium to complex systems where the biochemical reactions occur in a strict sequence, spreading throughout the celland are linked to one another via equilibrium constants, where the rate-limiting mechanism (i.e., the slowest reaction) is crucial in determining the final complex biochemical equilibrium. Whenever the system is complex, the equilibrium must be achieved, regardless of all possible restrictions and/orscruples; this is the realm of all. So, this final equilibrium, in human cells, is in fact the healthy/ill determining issue that will be governed by the remedy reaction products.

When considering homeopathic curing in the above concept, we must link the (HCB) to three mutually connected and clinically supported processes: i) the appearance of the specific illness symptoms of the targeted disease in an ill person associated with the change of the initial biochemical equilibrium, ii) the appearance of identical illness symptoms when a healthy person digests a remedy changing likewise the initial biochemical equilibrium iii) the disappearance of similar illness symptoms in the course of curing when an ill person digests a remedy and recovering the initial biochemical equilibrium.

In particular, the appearance and disappearance of illness symptoms, i.e., between processes i) and iii) are detrimental. Namely, when we equalized the illness symptoms with characteristic biochemical reactions and/or related reaction products, then the appearance and disappearance of the illness symptoms means direct evidence for the re-establishment of the initial biochemical equilibrium when consuming the remedy, which must take place, as the basic natural principle, i.e., the Le Chatelier principle, as stated above.

This can be considered as the direct clinical evidence of curing (using a remedy) that is a consequence of the re-establishment of the initial biochemical equilibrium, provided that a remedy exists that induces in a healthy person identical illness symptoms ≡ biochemical reactions products, as with the ill person, and demonstrates the Law of Similars.

One can consider the Le Chatelier principle in a more quantitative way, interpreting it using basic thermodynamic values. So,in an ill patient, the whole biochemical equilibrium deviates from the healthy state. This new equilibrium state then governs the status of an ill patient; however, in such cases, visible signs of the patient's behaviour and appearance indicate that the anticipated medicine is a deviation from the norm and/or healthy state. Therefore, the patient's behaviour is implicitly connected to essential biochemical reactions and/or reaction products of the new equilibrium state. The same status can be achieved when a healthy person consumes the remedy.

We will consider the biochemical equilibrium between the healthy state $[A]=\Sigma\nu_{na}A_n$ (*determine the status of a healthy patient*) and an ill state $[B]=\Sigma\nu_{nb}B_n$ (*determine the status of an ill patient*). Here, ν_{na} represents the number of vital molecules A_n maintaining the healthy state in the human body before the start of the illness process. On the other hand, ν_{nb} represents the number of molecules of the reaction products B_n formed during the progress of the illness. We can present the simplified biochemical equilibrium for the time consideredin the form:

Vital molecules↔reaction products:

$[A] \leftrightarrow [B]$

andthe corresponding equilibrium constant:

K=[B]/[A]

When the biochemical reactions associated with illness (the driving force) are taking place, the equilibrium moves to the right-hand side owing to the formation of the reaction products inducing illness associated with worsening of the healthy state. After the ill person digests the remedy, the concentration of the overall reaction product's molecules [B] prior the achievement of equilibrium increases. The number and composition of the vital molecules on the left-hand side $\nu_{na}A_n$ and the reaction products $\nu_{nb}B_n$causing illnessare not known and not pertinent for the model's interpretation. Here, only the status of the human body, healthy or ill, is imperative.

The above considerations (equilibrium constant) can be linked to the Law of Mass Action, which executes the restoration of the equilibrium. In chemistry, the Law of Mass Action states that the rate of a chemical reaction is directly proportional to the product of theconcentration of the reactants. Specifically, it implies that for a chemical reaction mixture in the system that is in equilibrium, the ratio (K) between the concentration of the reaction products [B] and the vital molecules [A] is constant. Therefore, the Law of Mass Action when the equilibrium constant is considered: K=[B]/[A] literally means that an increase in the concentration of the reaction products induced by the income of remedy [B] will make anincrease in the percentage of the vital molecules [A] in the system (see the supplement) and will shift the new biochemical equilibrium to the left-hand side and hereafter to a healthy state.

The remedy molecules that induce an illness with identical symptoms to a healthy person can cure an ill person. This observation is associated with the proposition that the symptoms caused by the remedy molecules in a healthy person cause similar symptoms and/or reaction products that also occur in an ill patient. In this context the above statement can be considered as the elementary, thermodynamically grounded mechanism of the curing principle of homeopathy, as already pointed out above.

In order to start the curing of the targeted illness on this basis, we have to find the right substances (remedies) that will produce alike symptoms in a healthy person. Consequently, a homeopathic specialist searches for an ingredient that produces, in a healthy person, those same symptoms that a patient experience in the ill state. Or in other words, the homeopath seeks to find the "simillimum" that is, the remedy that will cause, in overdose in experimental subjects, the most similar syndrome of symptoms that the sick person is experiencing. Here, one must be aware that in an ill person where the human organism is contesting the disease a very small amount of remedy is needed to restore the healthy-state equilibrium.

Here, we should mention the most well-known example of homeopathy, the use of Atropa belladonna (common name, deadly nightshade). This berry, which induces fever in healthy patients, is a homeopathic substance used to cure the fever in sick patients, and there are many other substances that show a similar curative effect.

The berry contains a large number of substances with active molecules, more than ten, besides atropine and scopolamine. In theory, for the start of curing,molecular constituent species of a remedy reaction product that are in excess, while satisfying the kinetic equilibrium (*theoretically a single molecular constituent species*), are the necessary and sufficient condition to trigger the equilibrium restoration on a molecular level and reduce the symptoms of the illness. This contribution proves that the Law of Similars, which represents the basis of curing mechanism in homeopathy, is directly linked to the Law Mass Action. This law enforces the initial biochemical equilibrium of a healthy person in an ill person after the consumption of the remedy.

Conclusion

The intention of this contribution was to use the elemental principles of the chemical thermodynamics to explain the Law of Similars which is the basis of curing mechanism in homeopathy. Here, the illness is linked to the Le Chatelier principle and/or to the Law of Mass Action when remedy reaction products are taking part in the complex equilibrium compartmentalized in human cells during the re-establishment of the initial biochemical equilibrium. The healing which is in this model accompanied with the increase of vital molecules [A] and accordingly with the re-establishment of the starting equilibrium will be achieved by the operation of the Law of mass action.

Supplement

An over-generalized example is presented that demonstrates the operation of the Law of Mass Action during the implementation of biochemical equilibrium throughout the process of curing, i.e., the increase of vital molecules [A] in the system on the account of remedy [B] digested/put in the system.

In the simplified biochemical equilibrium for the time considered we have the form:

- Vital molecules ↔Reaction products
- [A] ↔[B]

and the corresponding equilibrium constant:

- K=[B]/[A]

The starting composition of the system is [A]+[B]. When we add to the initial system, for example, 2[B] of remedy, then we obtain the system composition [A]+3[B]. This is then the true preliminary composition priorrestoring the equilibrium. After working of the biochemical equilibrium, and consequently the operation of the Law of Mass Action, one [B] changes in [A], according to the constant K and we obtain the final chemical composition 2[A]+2[B] in the system. Thus, during the equilibrium restoration the true preliminary composition of the system [A]+3[B] changes to final composition 2[A]+2[B]. So, in the system [A] increases by 100% according to [A]→2[A], while [B] decreases 3[B]→2[B] for 60%. This is the conformation of a strong increase of vital molecules [A] in the system on the account of remedy [B] added.

Typically, a homeopathic treatment does not comprise [B] directly, but rather some reaction products that caused illness symptoms. This makes the application of the Law of Mass Action slightly more complex, but it does not change the main argument.

Here the response times of these biochemical reactions to maintain equilibrium are longer than in the case of ionic reactions. This is due to the larger average molar mass of the organic molecular species in comparison to the single ionic species, which for a higher mass means a lower velocity of the molecular species (known as Graham's law). Consequently, due to that the remedy reaction products concentration and or their transport to the reaction location must be enormously synchronized, i.e.,drastically decreased, to prevent the accumulation of the key constituent reaction species in situ what could aggravate or even eliminate the equilibrium re-establishment and consequently the healing.

Namely, the excess of overall remedy reaction species can strong decrease the probability of the collisions and consequently the reaction of key molecule's, due to sterically reasons.

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