Temperament (Peerless Key Factor of Umoor- e-Badan): Definitions, Chemistry, and Biochemistry

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Abstract ***The word Temperament is derived from Latin word "Tempero" which means "to mix". When different qualities of elements act and react by their powers, then previous qualities become diminished and a new moderate quality is developed which is known as Mizaj. According to Ibn Nafees the word Mizaj is originated from Arabic word "Imtizaj" which means "intermixture". Every organ, plant and animal have almost different structure and functions according to the quality and quantity of their building material. According to Unani medicine all are made up of Ajzae Awwalia (Arkaan) and present science suggests protein, fat and carbohydrate as building blocks. Both Modern science and Unani medicine accept that building material is same for all animate objects but their quantity vary from organism to organism. So the scientific approach in relation to formation of substance is accurate since beginning. Now this formation can be defined physically and chemically at molecular level in which elements bind together by different types of chemical bonding. Medical science deals with human body that is why temperament formed in human being is the result of intermixture of different elements biochemically. This paper will update the chapter of Imtizaj (intermixing) of elements which results in formation of temperament.***

Key words: Mizaj Imtizaj, Ajza Awwalia, Chemical Bonding,

INTRODUCTION **Temperament** Quoting the words of **Rudolf E. Siegri**, ***Azmi*** says: "The Greek used to call the mixture of humours as "krasis" which is derived from "kerannyni" meaning "to mix". The word kerasis is usually translated as temperament. " The word "temperament" is derived from the Latin word "tempero" which means "to mix". This word temperament is used in the English language as a synonym of the Arabic word *mizaj*.

The Definitions of Temperament: The physicians of Unani medicine have dealt with temperament in detail and they defined it to the best of their knowledge and concepts. The Arab medical authors worked on the theory of temperament most assiduously and its description is found in the Arab medical literature under the heading *"mizaj"*. The views of different Unani Physicians are as follows:

Ali Ibn Abbas Majoosi: "All sorts of bodies (light or heavy), which are found in this ever-changing world are formed by four elements (*ustuqussat*) after mixing in different or uniform quantities in accordance with the needs (of the body). As a result of this mixing, one or two qualities become dominant, over the body, and this is called *'mizaj'*. It is derived from Arabic word *'imtizaj'*, meaning 'to mix with each other". [1] ***Abu Sehal Masihi***: "Because there are so many primary components (*ustuqussat*) of the body which are mixed together not in close proximity, it is necessary that the qualities of primary components must be mixed as a whole new qualities arise from inter-mixing of primary components which will be in between the previous qualities, called *mizaj*". [2] "The temperament is a quality resulting from the interaction of opposite qualities present in elements consisting of minute particles so that most of the particles of each of the elements may touch most of the others. Thus when these particles act and react on one another with their properties, there emerges from their total properties, a uniform quality which is present in all of them. This is the temperament (*Mizaj*)". ***Ibn-e-Sina*** further writes that "Since the primary properties in the aforesaid elements are four namely hotness, coldness, moistness and dryness, it is obvious that the temperaments of the integrating bodies are the products of these properties". [3] "When different qualities of elements acts and reacts by their powers then previous qualities become diminished and a new moderate quality is developed which is known as *mizaj*". [4] "Temperament is a quality produced by action and reaction of opposite qualities of body fluids (*Akhlat*). When these components interact by virtue of their respective powers (qualities) a condition is achieved which is found in equal proportions in all the components of that intermixture; this is called temperament". [5] ***Dawood Antaqi***: "*Mizaj* is a uniform quality which originates by the action and reaction of four elements which are divided into smaller particles so that the maximum particles of each can mix with each other".[6] ***Ayyub Israili***: "*Mizaj* is such type of moderate quality which is originated by the action and reaction of different opposite particles. When elements mix with each other and one element affects the other then they break into small particles due to action and reaction process. This process should be of such type that the biochemical structure of each element breaks the strength of quality of other elements, resulting in generation of a moderate secondary quality. This moderate secondary quality is known as *mizaj*".[7] ***Allama Sadidi***: "*Mizaj* is such type of *malmoosa* (touching) quality which is produced by the effects of different qualities of smaller particles of elements and the character to adopt the effects of these different qualities".[8] ***Ibn-e-Hubal Baghdadi***: "When elements get admixed, most of the elements mix with each other and their various qualities act and react so that heat breaks the cold and cold breaks the heat. Similarly dryness try to breaks wetness and wetness tries to break dryness. Low grade qualities mix with high grade qualities, light weight particles mix with heavy weight particles until a new quality is developed which is equally found in all the components of elements. This new and moderate quality is known as *mizaj*". [9] ***Allama Nafees***: "When elements mix with each other they act and react and this results in developing a new moderate quality between the all four previous qualities. This new quality is known as *mizaj*". [10] ***Narain***: The word temperament is derived from the Latin verb 'tempero' meaning to mix' or temper". [11] ***O. C. Gruner*:** Arabic word *mizaj* contains the idea of 'mixture'. Medical translators used the word commixtio or complexion which carries the idea of mixing or blending or weaving". [12] ***Abdul Lateef Falsafi***: "When Smaller particles of different elements mix with each other in such a way that the particles of each element mixes with the particles of other elements it results in the breakdown of qualities of all the elements due to which the qualities of each particle convert into a moderate quality and this quality is known as *mizaj*". [13] ***Shah***: "Temperament is the pattern of qualities as a whole which emerges from the action and

reaction of the mass and energy and thus in the human organism of the structure and function. As the basic qualities of the energy are heat and cold and of the mass are dryness and moisture, their natural inter actions leads to the emergence of a new balance of qualities which varies with the quantitative proportion of the primary qualities". [14] ***Syed Ishtiyaq Ahmed***: "*Mizaj* is defined as the new state of a matter having quality different from the present in the elements or compounds before coming in to *mizaj* (inter mixture of chemical combination) and which results from the action and reaction among the contrary qualities and powers present in the minute particles (Atoms) of different elements (or molecules of different compounds) when they are combined together the result is a new quality, a uniform state or the state of equilibrium emerging after the combination of more than one elements is called *mizaj*".[15] ***Altaf Ahmad Azmi***: "Temperament means final combination or form of elements (*Ustuqussat*). In other words formation of temperament in a compound depends on the number, ratio and atomic sequence of elements in the compound. The properties created in the compound differ from the properties of its constituents. A compound retains its properties as long as its elemental form is held together".[16] ***Mohd Iliyas Khan***: "*Mizaj* is such type of moderate quality, which is produced by the action and reaction and chemical changes in the small particles of different elements, which occur due to the effects of their specific powers. This moderate quality may differ in different persons and in species also". [17]

Temperament in relation with Kaifiyat Temperament is the quality which results from the interaction of the four primary qualities i.e. Hararat, Buroodat, Rutoobat and Yabusat. These primary properties are associated with four primary components in compound forms. Two properties i.e. hararat and buroodat are said active which cannot be together but they may be associated with either passive property i.e. yaboosat and rutoobat giving four combinations har ratab (air), har yabis. Because of dominance of the one primary building block *mizaj* is characterized by properties associated with that primary component and not neutralized by opposite quality. The *mizaj* is described in terms of dominant qualities as *har, ratab ,barid, yabis, har ratab, har yabis , barid ratab , barid yabis.*is (fire), barid ratab (water), barid yabis (earth). (10)

Relation of Temperament And Tabiyat The shape imparted by *mizaj* is *surat nau'iyah* (morphology of species), this surat (morphology) then lodges the *tabiyat*, which is compound specific. After the interaction of primary components *mizaj* imparts a shape for the lodgement of the *Tabiyat* which then performs intended function through pneuma dependent capacities associated with simple and compound organs nurtured by humours. For all types of functions that are mediated by *tabiyat*, specific capacity (power) exists, which is imparted by specific *mizaj* to the organs and as a whole to the body. These capacities work within limits of *mizaj*. Once the *tabiyat* is furnished to the specific structure it then works to maintain the *mizaj*, though *tabiyat* is subordinate but once it is furnished it opposes changes in *mizaj* by bringing changes in *tabayee* functions. Since every change in *mizaj* is associated with certain degree of weakness of powers, the weapon of *tabiyat*. In every type of *mizaji* deviation more or less it weakens the weapon of *tabiyat* i.e. power, thus underlying function can't be performed with normal efficacy even by the same structure. That is why initially structural changes remain obscure. So far as alteration in *mizaj* is concerned, since *mizaj* results from primary building blocks having matter and qualities, so any deviation in matter or qualities may result in *mizaji* deviation. These alterative may belong to the body or to exterior. (18)

Temperament & Surat Nau'iya Properties of a particular compound depend upon its *surat nau'iyah. Surat nau'iyah* is a thing which develops after *imtizaj*. After the combination of *anasir* a compound is formed having the ability of becoming a *nau'* (species) and attaining a new *surat nau'iyah*. Thus the *surat nau'iyah* is nothing but the molecular structure of that compound. (10)

Factors Affecting The Temperament (1).Khilqi Awamil (Hereditery factors), (2).Iktisabi Awamil (Aquired factors). Khilqi Awamil The alteration in the temperament of seminal fluid or in the fertilized ovum, alter the temperament of the offspring. This alteration may be localised that can affect an organ or it may be generalized that can affect the whole body leading to various kinds of malformations and hereditary diseases. Iktisabi Awamil depends upon environmental condition of that person. These are Asbabe zarooriya and Ghair zarooriya. Environmental factors do not contribute in the formation of a person's temperament but influence it overtime. Temperament differs in different seasons, regions, ages, individuals and organs. (15)

PURPOSE OF DISCUSSION OF THE TEMPERAMENT IN TIBB

Every Nau' has its own Temperament which is normal or equable for this Nau' but is abnormal for others. Just like the temperament of species other than human being is abnormal for the humans. Human being could be benefitted by the temperament of other species inspite of being abnormal. Physician has focused on the state of human body i.e. Health and disease. So it is the duty of the physician to know the temperament of human body and also the drug (other species) so that he would be able to treat or maintain the health of a person by treating through *ilaj bil misl* or *ilaj bil zid*. The gist is that we can take the advantage of this *mizaj ghair moatadil* for the purpose of *taadeel mizaj* means treatment of diseases of *sue mizaj* on the basis of *ilaj bil zid*.

Chemical Bond History Early speculations about the nature of the **chemical bond**, from as early as the 12th century, supposed that certain types of chemical species were joined by a type of chemical affinity. In 1704, Sir Isaac Newton famously outlined his atomic bonding theory, in "Query 31" of his Optics, where by atoms attach to each other by some "force". Specifically, after acknowledging the various popular theories in vogue at the time, of how atoms were reasoned to attach to each other, i.e. "hooked atoms", "glued together by rest", or "stuck together by conspiring motions", Newton states that he would rather infer from their cohesion, that "particles attract one another by some force, which in immediate contact is exceedingly strong, at small distances performs the chemical operations, and reaches not far from the particles with any sensible effect." In 1819, on the heels of the invention of the voltaic pile, Jöns Jakob Berzelius developed a theory of chemical combination stressing the electronegative and electropositive characters of the combining atoms. By the mid 19th century, Edward Frankland, F.A. Kekulé, A.S. Couper, Alexander Butlerov, and Hermann Kolbe, building on the theory of radicals, developed the theory of valency, originally called "combining power", in which compounds were joined owing to an attraction of positive and negative poles. In 1916, chemist Gilbert N. Lewis developed the concept of the electron-pair bond, in which two atoms may share one to six electrons, thus forming the single electron bond, a single bond, a double bond, or a triple bond; in Lewis's own words, "An electron may form a part of the shell of two different atoms and cannot be said to belong to either one exclusively."[2] That same year, Walther Kossel put forward a theory similar to Lewis' only his model

assumed complete transfers of electrons between atoms, and was thus a model of ionic bonding. Both Lewis and Kossel structured their bonding models on that of Abegg's rule (1904). Niels Bohr proposed a model of the atom and a model of the chemical bond. According to his model for a diatomic molecule, the electrons of the atoms of the molecule form a rotating ring whose plane is perpendicular to the axis of the molecule and equidistant from the atomic nuclei. The dynamic equilibrium of the molecular system is achieved through the balance of forces between the forces of attraction of nuclei to the plane of the ring of electrons and the forces of mutual repulsion of the nuclei. The Bohr model of the chemical bond took into account the Coulomb repulsion - the electrons in the ring are at the maximum distance from each other.[3][4] In 1927, the first mathematically complete quantum description of a simple chemical bond, i.e. that produced by one electron in the hydrogen molecular ion, H_2^+, was derived by the Danish physicist Oyvind Burrau.[5] This work showed that the quantum approach to chemical bonds could be fundamentally and quantitatively correct, but the mathematical methods used could not be extended to molecules containing more than one electron. A more practical, albeit less quantitative, approach was put forward in the same year by Walter Heitler and Fritz London. The Heitler–London method forms the basis of what is now called valence bond theory. In 1929, the linear combination of atomic orbitals molecular orbital method (LCAO) approximation was introduced by Sir John Lennard-Jones, who also suggested methods to derive electronic structures of molecules of F_2(fluorine) and O_2 (oxygen) molecules, from basic quantum principles. This molecular orbital theory represented a covalent bond as an orbital formed by combining the quantum mechanical Schrödingeratomic orbitals which had been hypothesized for electrons in single atoms. The equations for bonding electrons in multi-electron atoms could not be solved to mathematical perfection (i.e., *analytically*), but approximations for them still gave many good qualitative predictions and results. Most quantitative calculations in modern quantum chemistry use either valence bond or molecular orbital theory as a starting point, although a third approach, density functional theory, has become increasingly popular in recent years. In 1933, H. H. James and A. S. Coolidge carried out a calculation on the dihydrogen molecule that, unlike all previous calculation which used functions only of the distance of the electron from the atomic nucleus, used functions which also explicitly added the distance between the two electrons.[6] With up to 13 adjustable parameters they obtained a result very close to the experimental result for the dissociation energy. Later extensions have used up to 54 parameters and gave excellent agreement with experiments. This calculation convinced the scientific community that quantum theory could give agreement with experiment. However this approach has none of the physical pictures of the valence bond and molecular orbital theories and is difficult to extend to larger molecules.

A chemical bond is a lasting attraction between atoms, ions or molecules that enables the formation of chemical compounds. The bond may result from the electrostatic force of attraction between oppositely charged ions as in ionic bonds; or through the sharing of electrons as in covalent bonds. The strength of chemical bonds varies considerably; there are "strong bonds" or "primary bond" such as metallic, covalent or ionic bonds and "weak bonds" or "secondary bond" such as dipole–dipole interactions, the London dispersion force and hydrogen bonding.

Since opposite charges attract via a simple electromagnetic force, the negatively charged electrons that are orbiting the nucleus and the positively charged protons in the nucleus attract each other. An electron positioned between two nuclei will be attracted to both of them, and the nuclei will be attracted toward electrons in this position. This attraction constitutes the chemical bond. Due to the wave nature of electrons and their smaller mass, they must occupy a much larger amount of volume compared with the nuclei, and this volume occupied by the electrons keeps the atomic nuclei in a bond relatively far apart, as compared with the size of the nuclei themselves.

All bonds can be explained by quantum theory, but, in practice, simplification rules allow chemists to predict the strength, directionality, and polarity of bonds. The octet rule and VSEPR theory are two examples. More sophisticated theories are valence bond theory which includes orbital hybridization and resonance, and molecular orbital theory which includes linear combination of atomic orbitals and ligand field theory. Electrostaticsare used to describe bond polarities and the effects they have on chemical substances.

Types of chemical bonds A chemical bond is an attraction between atoms. This attraction may be seen as the result of different behaviors of the outermost or valence electrons of atoms. In the simplest view of a **covalent** bond, one or more electrons (often a pair of electrons) are drawn into the space between the two atomic nuclei. Energy is released by bond formation. This is not as a reduction in potential energy, because the attraction of the two electrons to the two protons is offset by the electron-electron and proton-proton repulsions. Instead, the release of energy (and hence stability of the bond) arises from the reduction in kinetic energy due to the electrons being in a more spatially distributed (i.e. longer de Broglie wavelength) orbital compared with each electron being confined closer to its respective nucleus. In a polar covalent bond, one or more electrons are unequally shared between two nuclei. Covalent bonds often result in the formation of small collections of better-connected atoms called molecules, which in solids and liquids are bound to other molecules by forces that are often much weaker than the covalent bonds that hold the molecules internally together. Such weak intermolecular bonds give organic molecular substances, such as waxes and oils, their soft bulk character, and their low melting points (in liquids, molecules must cease most structured or oriented contact with each other). When covalent bonds link long chains of atoms in large molecules, however (as in polymers such as nylon), or when covalent bonds extend in networks through solids that are not composed of discrete molecules (such as diamond or quartz or the silicate minerals in many types of rock) then the structures that result may be both strong and tough, at least in the direction oriented correctly with networks of covalent bonds. Also, the melting points of such covalent polymers and networks increase greatly.

In a simplified view of an ***ionic*** bond, the bonding electron is not shared at all, but transferred. In this type of bond, the outer atomic orbital of one atom has a vacancy which allows the addition of one or more electrons. These newly added electrons potentially occupy a lower energy-state (effectively closer to more nuclear charge) than they experience in a different atom. Thus, one nucleus offers a more tightly bound position to an electron than does another nucleus, with the result that one atom may transfer an electron to the other. This transfer causes one atom to assume a net positive charge, and the other to assume a net negative charge. The *bond* then results from electrostatic attraction between atoms and the atoms become positive or negatively charged ions. Ionic bonds may be seen as extreme examples of polarization in covalent bonds. Often, such bonds have no particular orientation in space, since they result from equal electrostatic attraction of each ion to all ions around them.

Ionic bonds are strong (and thus ionic substances require high temperatures to melt) but also brittle, since the forces between ions are short-range and do not easily bridge cracks and fractures. This type of bond gives rise to the physical characteristics of crystals of classic mineral salts, such as table salt.

A less often mentioned type of bonding is **metallic** bonding. In this type of bonding, each atom in a metal donates one or more electrons to a "sea" of electrons that reside between many metal atoms. In this sea, each electron is free (by virtue of its wave nature) to be associated with a great many atoms at once. The bond results because the metal atoms become somewhat positively charged due to loss of their electrons while the electrons remain attracted to many atoms, without being part of any given atom. This type of bonding is often very strong (resulting in the tensile strength of metals). However, metallic bonding is more collective in nature than other types, and so they allow metal crystals to more easily deform, because they are composed of atoms attracted to each other, but not in any particularly-oriented ways. This results in the malleability of metals. The sea of electrons in metallic bonding causes the characteristically good electrical and thermal conductivity of metals, and also their "shiny" reflection of most frequencies of white light.

Discussion

CONCLUSION

Mizaj is the core concept of Unani medicine, whole Unani therapy i.e. diagnosis and treatment revolves around this concept. Disease in two individuals, even in same individual at different time cannot be identical then the treatment will also be different. Imbalance in temperament predisposes human body to various diseases by producing a biotic imbalance within body. Mizaj enforces the same material to acquire the different shapes in different organism and in different organs of the same organism. Temperament is an intrinsic state which enables an individual to survive and to procreate comfortably and is responsible for distinctive morpho-bio-physio-immuno and psychological identity of an individual. In broad context mizaj is an existing dynamic state of the body at which structure and functions are in perfect harmony with ambient biosphere. *Mizaj* is not an static entity rather flexible in between two limits of high and low for a species, race, individual and organ. This flexibility imparts functional variations and adjustability according to age, gender, habit and environment.

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