

The Theory of Humours revisited

Dr John P Glynn and Prof Rashid Bhikha

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Historical background

For more than 2000 years the theory of humours provided a sound, satisfactory explanation for the make-up and workings of the human body, both in health and in disease¹. It first surfaced in Ancient Greece, although the original concept probably goes back to the time of the Pharaohs in Egypt. The theory was one of the main pillars of the teachings of Hippocrates (460-370 BCE), the early pioneer of medical practice. Justly described as the *Father of Modern Medicine*, he and his colleagues brought medicine out of the realm of superstition, magic and the supernatural into the sphere of rationality and logic. From Hippocrates onward, the humoral theory entered the mainstream of medical thought, especially as it was adopted by Galen (ca.130 - 200 CE), other titans of medicine, scholars such as Ibn Sina (980-1037 CE), and Western European herbalist practitioners like Culpeper (1616-1654 CE)². A measure of its effectiveness is that it remained a major influence on medical and pharmaceutical practice in Europe until well into the 19th century, when modern medicine made its debut³.

The theoretical nature of the humoral system merged perfectly into a period of intense logical, theological and philosophical debate and exploration. It fitted in with the divine order of things, with its underlying concepts of balance and imbalance, harmony and discord, health and disease, as basic linked concepts. For centuries, Greek, Roman and later Muslim and Western European medical philosophers and pioneers took to it readily, and philosophers like Augustine of Hippo, Thomas Aquinas and Ibn Sina fully supported it⁴. Some relatively minor changes were made in the light of observation, biological knowledge and medical experience, but it became firmly established as a way of thinking about the person in particular, and the natural world in general. Its validity was not questioned, and was virtually unchallenged for centuries. In fact, the humoral theory was the foundation of Western medicine well into the 1800s.

The humoral theory

The humoral theory is based on the notion of the primordial *elements*⁵. In ancient Greece the material universe was thought to be made up of four elements: Fire, Air, Water and Earth. These were regarded as the building blocks of all creation. Knowledge of natural systems was further extended by the concept of *qualities*. The four were heat, dryness, moistness and coldness. Each of the four elements is described by two of those qualities, which links the elements. Fire is considered *Dry & Hot*; air is *Hot & Moist*; water is *Moist & Cold*; and earth is *Cold & Dry*.

These concepts of elements and qualities are further expanded in relation to most areas of personal experience – the heavenly bodies, seasons of the year, climatic influences, daily time periods, properties of food and drink, herbal medicines, tissues and organs in the body, physiological activity in the body, symptoms of disease and many other objects and phenomena⁶. Some are shown in the table below:

	Fire	Air	Water	Earth
Qualities	Hot & Dry	Hot & Moist	Cold & Moist	Cold & Dry
Season	Summer	Spring	Winter	Autumn
Humour	Yellow bile	Blood	Phlegm	Black bile
Temperament	Bilious	Sanguine	Phlegmatic	Melancholic
Body tissues	Nerve tissue	Muscles, blood	Lymph, fluid, fat	Ligaments, skeleton
Body function	Metabolism	Respiration	Nutrition	Formation
Faculty	Attractive	Digestive	Propulsive	Retentive
Sense	Smell	Taste	Sight	Hearing
Mental state	Anger	Humour	Submission	Stubbornness
Emotion	Excitement	Cheerfulness	Apathy	Depression
Flavour	Bitter	Sweet	Salt	Sour
Age	Youth	Childhood	Maturity	Adulthood
Time	Afternoon	Morning	Night	Evening

According to Tibb, the human body is made up of three main groups of material:

- (a) **Solid parts** – cellular structures (cells, tissues, organs)
- (b) **Liquid parts** – enclosed in body cavities (blood, lymph, meningeal fluid, intercellular fluids)
- (c) **Gaseous parts** – pneuma (breath, sinuses)

Humours are one of the natural, intrinsic factors in Tibb

1. *Elements*
2. *Temperament*
3. *Humours*
4. *Organs & members*
5. *Physis or vital spirit*
6. *Faculties*
7. *Functions*

In the human body there are four basic fluids, the so-called *humours*. These are blood, phlegm, yellow bile and black bile. Blood has the qualities of being *hot and moist*; whereas phlegm is *cold and moist*. In turn, yellow bile is *hot and dry*, and black bile, *cold and dry*.

Each humour was linked to a specific season in the year. Blood, with its qualities of heat and moistness, was associated with spring, yellow bile (hot and dry) with summer, phlegm (cold and moist) with autumn, and black bile (cold and dry) with winter.

Humour	Fluid	Element	Season	Attributes	Organ
Sanguine	blood	air	spring	hot and moist sweet red	heart
Bilious	yellow bile	fire	summer	hot and dry bitter yellow	liver / gall
Phlegmatic	phlegm	water	autumn	cold and moist tasteless white	lungs or kidneys
Melancholic	black bile	earth	winter	cold and dry sour brown, black	spleen

The humours are the agents by which bodily nutrition, tissue growth, repair to tissues and organs, and energy provision is achieved. In summary, they are instrumental in ensuring the preservation of the individual's health, and ultimately the survival of our species⁷

Nature of the humours

The word 'humour' is Latin for liquid or fluid. The humours are the second most important source of life, after *pneuma*, the fundamental vital energy. The humours are vital essences that course through the blood vessels, exert control over the body's metabolism, and influence the functions of all physiological systems. The humours are manufactured in the liver from nutrients that have been extracted by the digestive system from food and liquids¹¹.

Not every liquid in the body is a humour. Body fluid and humour are not identical, interchangeable or synonymous. For instance, urine and sweat are liquids, but not humours. Also, the sanguine humour associated with blood is not the liquid drawn by hypodermic needle. Nor is the phlegmatic humour the same as saliva, mucus or phlegm itself.

A humour is an admixture of a range of macromolecules, mainly proteins, polysaccharides and nucleic acids. These in turn are derived from their precursors, amino acids, sugars and nucleotides. Enzymes, electrolytes, hormones and a number of organic molecules and co-factors are also present. They also vary in terms of acidic or basic nature. Different humours vary in their spectrum of these biochemical components, and in their range of concentrations. Each humour is an admixture of all four humours, but with one predominating. So the sanguinous humour contains some phlegmatic, bilious and melancholic humour, although the sanguinous humour by far is the major component^{8, 10}.

The humours are classified according to:

- (a) Their **location** (whether within organs, or in cells as protoplasm);
- (b) Their **colour** (whether red, yellow, white or colourless, or brown/ black);
- (c) Their **function** (whether they are beneficial in maintaining metabolic harmony, or are detrimental to the body's activity);
- (d) Their **status** (whether primary, or circulatory; or secondary, or resident within tissues)
- (e) Their **structure** (whether fine or coarse);
- (f) Their **nature** (whether normal, so have a specific function; or abnormal, with no specific value, so need to be expelled).

As a general point:

- All **red** fluids in the body fall within the *sanguinous* humour;
- All **white** or **colourless** fluids fall under the *phlegmatic* humour;
- All **yellow** fluids fall under the *bilious* humour;
- All **brown** fluids fall under the *melancholic* humour.

Although there is a clear link between a particular humour and a specific body fluid, the humour is to a large extent separate from the fluid, and independent of it. Gruner⁹ calls them 'quasi-materials'. The sanguinous humour represents the nutritive aspect of blood; the phlegm corresponds to the purifying and cooling aspects of metabolic activity; the yellow bile the heating and stimulating aspects of metabolic activity, and black bile the drying, concentrating and solidifying aspects. Another feature of this close relationship between the humour and the body fluid is that a disturbance or imbalance in the humour will manifest as an abnormality in the fluid itself. This is the basis of a number of Tibb diagnostic tests⁸.

The idea of humours probably came from observing what happens to freshly drawn blood, which separates slowly into four distinct fractions. The major red portion was termed the sanguinous (blood) humour, the white layer material is phlegm, the yellow-coloured froth on top is the yellow bile, and the heavy part that settles down is the black bile.

Features and functions of the humours

Humours are produced in the liver, according to the nature of the foods eaten and the degree of their digestion. They are then transferred to the vascular system, and from here they are distributed to all bodily cells, tissues and organs^{8, 11}.

The production of humours is influenced by the qualities of heat, coldness, moistness and dryness prevailing during the liver's metabolic processes. However, as these require substantial amounts of

heat to function properly, the amount of heat available at the time plays an important role in the production of humours.

The phlegmatic humour (Cold & Moist) requires the least amount of heat, so is produced first. This is followed by sanguinous (Hot & Moist), bilious (Hot & Dry), and finally melancholic (Cold & Dry), which needs most heat.

Each humour has specific qualities associated with it. Changes to these qualities, brought on by the lifestyle factors, results in the conversion of the normal humoral state to an abnormal one. These abnormal states will lead to clinical disorders if physis is unable to remove the abnormal humour from the body effectively, and in good time.

A. Sanguinous humour

As the overall temperament of the human body is Hot & Moist, the sanguinous humour is present in the largest concentrations. It is the most important humour. Its function is providing nourishment to every cell, tissue and organ within the body. The sanguinous humour also serves as the carrier for the other three humours. It transports them to wherever in the body they are needed to carry out their dedicated activities.

Normal sanguinous humour manifests itself materially in the red colour of blood. It has no odour, and is hot and sweet to the taste. It is both actually hot and potentially hot. Organs richly supplied with blood are hot, and those whose blood supply is comparatively less are comparatively colder. Those organs whose blood supply is cut off become markedly cold and dead, maybe gangrenous. It also helps maintain body temperature. The reason for it being moist is that it largely (91-92%) water.

Water possesses certain qualities needed to maintain body temperature:

1. A high **specific heat**
(A calorie is the amount of heat needed to raise the temperature of one gram of a substance by one degree Celsius; water has a specific heat of 1.00).
2. High **thermal conductivity**
(Thermal conductivity measures the ability of a material to transfer heat).
3. High **latent heat of evaporation**
(The heat of evaporation is the heat absorbed by a unit mass of a material at its boiling point in order to convert the material into a gas at the same temperature).

Note: Heat and moistness are needed for the maintenance of life. For life to exist, an ideal balance of heat and moistness is required. (This can be observed in nature: Plants need an ideal level of heat and moisture for survival. During spring time, flowers blossom as the heat gradually increases after the cold of winter. If either quality – heat or moistness – is in excess or deficient, death may ensue).

The body's heat and moistness levels are maintained via the *lifestyle factors*. As we are all uniquely created, the ideal level of heat and moistness needed by each individual varies according to their temperament. Death, old age and end stage of disease are linked to the qualities of coldness and dryness. These are opposite the life-giving qualities of heat and moistness. Similarly, in pathological processes, obstruction of blood flow (*ischaemia*), and tissue necrosis are linked to the qualities of coldness and dryness.

Functions of the sanguinous humour⁹

The sanguinous humour is active in the following metabolic functions:

1. **Nutrition.** It supplies nutrient-rich material to the body's tissues and organs, which is metabolised to provide energy. This energy in turn is used for growth and maintenance of the body.
(Nafis says: "The sanguinous humour is best of all and best of the nutriments for the body because whatever is lost from the body is replaced by the sanguinous humour".)
2. **Transport.** It acts as a vehicle for the transport of all materials to and from the tissues, whatever their roles.
3. **Heat regulation.** It keeps the body warm and maintains the body's temperature constant.
4. **Oxygen carrier.** It acts as the prime carrier of oxygen. When inspired air reaches into the alveoli of the lungs, oxygen is absorbed into this humour and is conveyed to all bodily tissues.
5. **Waste elimination.** It transports oxygen's waste product (carbon dioxide) from the tissues to the lungs, from where it is expelled from the body. Furthermore, it carries all other humoral waste and waste from general wear and tear from the tissues to be expelled via the excretory organs.
6. **Defence.** It transports the cellular components which comprise the defense system against foreign bodies.
7. **Skin health.** It maintains the health of the skin, so enhancing its appearance and shine.

B. Phlegmatic humour

This is the second most abundant humour. Like the sanguinous humour, but unlike the bilious and melancholic humours, it does not have a storage reservoir. The reason is that the phlegmatic humour is also needed by every cell, tissue and organ in the body. The material form of normal phlegmatic humour is sweet (although less than the sanguinous), and moderately cold.

Functions of the phlegmatic humour⁹

The phlegmatic humour is active in the following metabolic functions:

1. **Reserve store.** When there is a shortage of sanguinous humour in the body, the phlegmatic humour is transformed into the sanguinous humour, due to its inability to be completely digested.
(Nafis says: "since the phlegmatic humour can be needed at any place for the nutrition of the body, hence there is no vessel for the storage of the phlegmatic humour, but it has been flown with the flow of the sanguinous humour and it has been spread away in the organs (cells and tissues), so that whenever there is deficiency of the sanguinous humour in tissues it could be readily available.")
2. **Moisture source.** An ideal concentration of phlegmatic humour is necessary for normal day-to-day activities, physical maintenance and repair. The phlegmatic humour supplies the body's organs with the necessary moisture to function properly. Particularly involved are the brain and other nervous tissue which exhibit a dominance of phlegmatic humour.
3. **Lubrication.** It serves as a general lubricant within the body, by preventing friction between and within body structures, so protecting the body's internal organs and structures, especially the skeletal joints. The phlegmatic humour in the synovial cavities supply nourishment to the intra-capsular parts of the joints and furnish lubrication.

4. **System support.** It stimulates mucous and serous fluid secretion from various mucous and serous membranes of the body. It also performs other functions in, for example, the gastro-intestinal, naso-respiratory and uro-genital tracts, and in the pericardial, pleural and peritoneal fluids.
5. **Visual function.** It maintains the integrity of the intraocular fluids (aqueous and vitreous fluids), and supplies nourishment to various parts of the eye, and maintains intraocular pressure.

C. The bilious humour

The bilious humour is stored in the gallbladder, secreted into the lumen of the gastro-intestinal tract, and excreted via the stool and urine in the form of bilirubin, biliverdin and other substances. These and related metabolites give the stool and urine their typical brown and yellow colours respectively. The material form of normal bilious humour is yellow in colour, light in nature, and pungent in smell.

Functions of the bilious humour⁹

The bilious humour is active in the following biological functions:

1. **Reserve store.** It supplies and replenishes those body's tissues and organs which possess dominance of the bilious humour (specifically heat), such as the lungs and the gallbladder.
2. **Distribution.** It allows thinning of the vascular fluid (specifically its Hot & Dry qualities), in order to allow it to penetrate more effectively into the narrow capillaries.
3. **Anti-coagulant.** It prevents the formation of a blood clot (*embolus*), by exerting its anti-melancholic and anti-coagulant properties.
4. **Digestion.** It helps emulsify dietary fats, so aiding the digestive process.
5. **Astringent.** It helps cleanse the intestines of thick, viscous mucus, so removing accumulated phlegmatic and melancholic humours.
6. **Elimination.** It stimulates the musculature lining the intestines, so promoting efficient peristalsis and so better defaecation.
7. **Vermifuge.** It acts as a natural anti-helminthic agent, killing or expelling intestinal worms.

D. The melancholic humour

The melancholic humour is stored in the spleen, which it nourishes. The material form of the normal melancholic humour is a sediment or residue which forms in collected blood when left standing. Its taste varies between bitter and acrid.

Functions of the melancholic humour⁹

The melancholic humour is active in the following bodily functions:

1. **Reserve store.** It supplies and replenishes the body's tissues and organs which possess dominance of the melancholic humour (specifically dryness), such as the bones.
2. **Food intake.** It signals the intensity of appetite experienced by the person.
3. **Blood quality.** It provides the requisite density and consistency to the vascular fluid.
4. **Platelet aggregation.** It supports the activity of platelets in the blood coagulation process.
5. **Skin protection.** It assists in the formation of *melanin*, a natural sun-screening skin pigment which provides protection from harmful sunlight.

According to Tibb, understanding the features and functions of normal humours is a prerequisite to understanding the pathology of a particular disease. For example:

- (a) The melancholic humour has coagulation properties, so excess (or abnormal) melancholic humour may be the cause of vascular lesions associated with ischaemia.**
- (b) The phlegmatic humour has lubricating properties, so it may be responsible for joint pain in arthritis. If it hardens or thins it may lose its soothing properties.**
- (c) The bilious humour is pungent, so may cause a burning sensation in the oesophagus when regurgitated.**
- (d) The sanguinous humour in excess can lead to disorders related to hypervolaemia, such as hypertension.**

In reality, there are four major humours: blood, phlegm, yellow bile and black bile. However, within these groups there are many – hundreds, or even more – of a minor nature.

Humours and the environment

A person's humoral balance is inter-connected with other phenomena in a complex and holistic web, and even astrological status and social class. Everyone has a unique temperament, so what was healthy for one person might not be so for another. To overcome this lack of consistency, individual humoral treatments, known as "regimens," were designed with the person (not the disease) in mind, with the aim of restoring the person's ideal humoral balance. This was achieved by one or more procedures: cupping, purging, enemas, hydrotherapy and steam baths, for instance. These hands-on interventions were supplemented with changes to food and drink intake and other changes to the patient's lifestyle. Medications based on herbs or minerals were generally used¹³.

Humours and health

To achieve and maintain perfect health, the person's four humours have to be of the right consistency and in perfect balance (*homeostasis*) in terms of quality and quantity¹⁴. This is described as *eucrasia*, a term employed by Hippocrates. Disease and other disabilities developed when this balance becomes disturbed for some time, usually from an excess or deficiency of different humours. This is termed *dyscrasia*. The actual qualities of the humours have an important effect on the nature of disease. If moistness, for example, is the dominant quality, then phlegmatic disorders like sinusitis may develop. Or, if the dominant imbalance is due to an excess of heat, then disorders like arthritis and heart problems may appear. A lack of balance or surplus in the humours could also have an adverse effect on a person's temperament¹⁵. Even today we often refer to someone as being sanguine, phlegmatic, bilious or melancholic in nature.

According to Tibb, "Health is harmony between the humours". It is only when the person's humours are unbalanced that the ground is made fertile for the disease to develop.

Humours and disease

The humoral theory provides the basis for Tibb clinical pathology¹¹. When the quality and quantity of the humours is in balance, then health prevails. When out of balance, the disease will appear. This situation therefore provides the theoretical basis for Tibb therapeutic practice, especially when treating metabolic diseases like diabetes, or infectious diseases like tuberculosis.

In the times of Hippocrates and Ibn Sina, individual diseases were not described in the same way that modern medicine classifies them now. Diseases were not seen as forces or entities separate from the person's body or mind, but instead were viewed as manifestations of humoral imbalance. The physicians of the period, trained in humoral theory alone, relied not only on knowledge of medical texts, but also on his personal understanding of the patient and professional intuition. Humoral imbalance was evident from the patient's input, and from inspection of the blood, urine and other body fluids.

Several common ailments, their corresponding humoral imbalance, and associated qualities are shown as examples below:

Disease	Humoral imbalance	Qualities
<i>Primary Hypertension</i>	Sanguinous	Hot & Moist
<i>Sinusitis</i>	Phlegmatic	Cold & Moist
<i>Hepatitis</i>	Bilious	Hot & Dry
<i>Osteo-arthritis</i>	Melancholic	Cold & Dry

Many factors adversely affect the person's humoral composition and balance. Organ malfunction is a major one, but many relate to an unwise lifestyle: poor food consumption, breathing poor quality air continuously, sleeping badly, and exposure to unseasonal weather.

Both physical well-being and mental health depended on an appropriate balance among the four humours. It also points to susceptibility to certain ailments, personal habits and behaviour patterns.

Other aspects of daily life are also important in affecting humoral balance. A person's occupation, his or her geographical location, and the time of year, for example, also have an effect on the humoral balance. If this balance was upset by a life event (such as the onset of puberty or pregnancy), or a change in weather or season, or restriction in food from a famine, or an epidemic, then a health crisis will surely follow.

Humours and infection¹⁵

The Tibb practitioners in ancient times were unable to detect and describe microbes, as present-day technology was not available. However, they did ascribe the phenomenon of putrefaction of living tissue to airborne but invisible agents. They were convinced that infection and contagion were due to undetectable, minute, disease-causing entities. Infections and parasitic infestations were not blamed upon abnormal humours, but on these airborne micro-organisms. They considered that these agents had a detrimental effect on the patient's Physis, which lead to a diminished response to the invasion by the pathogenic microbes. The patient's tissue became disordered, and therefore more susceptible to the impact of the microbes.

For practitioners in ancient times, the response to infection was to strengthen Physis, rather than try to overcome the offending microbes. They were aware that Physis, which can draw a large number of defence mechanisms, was generally quite capable of repulsing attacks by environmental pathogens, and that people rarely fatally succumbed to infection due to its protection. Treatment was based on supporting Physis by a range of herbal and other therapies, which were deemed to restore humoral balance back to normal. The practitioners were aware that we are all surrounded by potentially pathogenic organisms in the atmosphere at all times, and there are also other pathogens dwelling within us. Trying to eradicate these is a forlorn pursuit. It is a much more effective strategy to strengthen the body's defences.

Supporting Physis generally meant helping to restore humoral harmony which had been disturbed by the infective agent. Pathogens affect the patient's bodily fluids – the 'culture media' – by upsetting humoral balance in several ways:

- (a) By consuming and destroying the normal, beneficial humours;
- (b) By releasing toxins which distort humoral balance, as in septicaemia;
- (c) By adversely affecting internal organs, so Physis' protection is compromised;

The cause of disease (both infections and those of metabolic origin) is identified in Tibb as the result of a massive disturbance in both the quality and quantity of the humours, and the formation of abnormal humours which persist in the body. Treatment, therefore, is directed at restoring humoral harmony, with little or no account taken of the nature of the pathogen. One advantage of this approach is that treatment does not await laboratory data indicating susceptibility of the offending organism to antibiotics.

Tibb treatment of the patient's humoral imbalance in infectious disease is patient orientated. Conventional modern medicine, on the other hand, is pathogen focussed.

The humoral theory and the germ theory of the origin of infectious disease can be reconciled – they are not mutually contradictory. Tibb asserts that the real cause of disease is the patient's adoption of a faulty lifestyle. One or more of the Lifestyle Factors (previously termed the '*Essential Causes*') is detrimental to the person's well-being. The faulty lifestyle has led to the person's Physis weakening. In effect, the antibodies which should be made available to counteract the invading pathogens are not synthesised. The microbe become established in a fertile culture media, and is able to release damaging toxins.

The Lifestyle Factors, or Essential Causes, are:

1. ***Atmospheric air***
2. ***Food and drink***
3. ***Bodily movement and repose***
4. ***Mental or psychic activity and rest***
5. ***Sleep and wakefulness***
6. ***Evacuation and retention***

Humours and temperament¹⁷

The theory of humours is also involved in the concept of *temperament*^{17a}. This is a compound measure of a person's psychological nature, physical form, genetic make-up, and other factors which combine to define a person's uniqueness. Ibn Sina extended the description of temperament to include emotional factors, mental rigour, moral position, physical activity and even dream quality. Temperament is a very important aspect of Tibb diagnosis, treatment and maintenance of health.

Every one of us has a dominant temperament. This is supported by a sub-dominant temperament, which 'fine-tunes' the dominant status. So a person could be dominant sanguinous, with subdominant phlegmatic. This allows for a more flexible description of the person's uniqueness.

When there is an imbalance in the quality and/or quantity of humours in the person's body, the temperament becomes adversely affected. If severe enough, or is maintained for some time, then a clinical disorder will develop.

Galen invoked the theory of humours into his particular interpretation of temperament. He developed a realistic classification, and sought physiological reasons to explain different behaviour in different people. A person's temperament reflected the influence of particular humours: if the sanguine humour was dominant, then the person was more likely to be optimistic and buoyant. Similarly, the other humours had their own characteristic personality traits – phlegmatic (sluggish, relaxed), bilious (quick-tempered, assertive), and melancholic (low-spirited, dejected). Any major or lasting imbalance between the qualities leads to illness or an exaggerated personality feature.

The ideal temperament occurs when the four humours are in perfect balance. However, in real life there is no one perfect person.

The role of Physis in the humoral theory¹⁸

Every person is characterised by a unique combination of humours. These are not present in rigid form, or in unchanging amount. They fluctuate continually in both composition and amount within the body, responding to changes in food and drink, climate and the seasons, physical activity and other lifestyle factors, and as we get older. Most changes are corrected promptly as they occur, without any disruption to the person's daily activities. This can be compared to a helmsman making minor but regular changes to a ship's course as it sails across the sea, to counteract the effects of cross-winds and opposing currents.

In Tibb, another cardinal principle is *Physis*. This is the body's innate capacity for self-healing and maintaining homeostasis (q.v.). It is the body's principal administrator, responsible for day-to-day metabolic regulation, and for immediate and long-term survival. It can be regarded as the *doctor within*, the driving force behind inner healing. All natural therapies and treatments, whether physical 'hands-on' techniques like cupping, herbal remedies, dietary measures or lifestyle reform, are obliged to encourage and support it, and so contribute to restoring humoral balance.

When someone's humours are in balance, a state called *homeostasis* exists. This is the biological basis for good health. This balance is maintained and regulated by Physis. If it is weakened, for instance, by exposure to malign forces like pathogens, or by an faulty, deficient lifestyle, then a

disturbance to the humoral balance will probably develop. If not corrected properly this may progress to a particular disease.

Humours in other medical systems^{19,19a}

The Tibb model of medicine is currently practiced extensively in India, Pakistan, Iran and the Arabic countries. A major pillar of its philosophy, as we have seen, is the emphasis on the humours and their role in diagnosis, treatment, disease prevention and recuperation. However, this concept is not exclusive to Tibb. Such notions of humours have parallels in other traditional medical systems, especially in Chinese and Ayurvedic medicine.

In Chinese traditional medicine, the body is thought to be made up of five elements: earth, fire, water, wood and metal. Health and disease are dependent on the balance between these elements.

In Ayurveda the theory of *tridosha* defines three humours: phlegm, air and bile, which are present in all living creatures. Imbalance or excess due to poor diet, a toxic environment or imprudent lifestyle is responsible for ill health developing.

Interestingly, Native American traditional medicine also subscribes to a modified version of the humoral theory. This concept must therefore have arisen spontaneously, as direct contact with 'Old World' cultures is most unlikely.

Humours and medical practice

Until the arrival of modern medicine, physical examination as part of diagnosis was rare, and usually perfunctory. The medical technology we now taken for granted was not available. However, *prognosis* was a well-developed and practiced skill, and much attention was paid to detailed descriptions of the different stages of the ailment. Preventative treatment was very important, and based to a greater or lesser extent on the person's basic humoral status. Importantly, the relationship between health status, the person's temperament, his or her lifestyle, and the environment was fully recognised and accepted. This is the *ecological theory of health*.

For the medical practitioner at the time, the humoral theory provided a body of scientific knowledge which required dedicated learning, understanding and consummate skills in its practice. It also contributed to tight control, regulation and organisation of its exponents. Patients, for their part, were happy with the sometimes heroic treatment meted out, as they generally understood and accepted the basic aspects of humoral theory. Blood, phlegm and bile are real, tangible and visible; the drug receptors, the cornerstone of modern pharmacology, are not. Most patients recovered, even from serious illnesses. If not, that was ascribed to divine will. All were satisfied that 'everything had been done'.

Correcting humoral balance

There are numerous ways an imbalance or excess of humours, or the presence of abnormal humours, can be corrected in someone suffering from a particular ailment. They usually involve measures which actively restore normal humoral balance, and are usually benign. However, any measures adopted – herbal medicines, changes to diet and lifestyle – had to support Physis.

Herbal remedies were commonly used for chronic, recurring disorders of digestion, breathing, reproduction and the skin, and as a general tonic. They were also used to treat victims of epidemics such as cholera and the plague, and the results of injuries sustained in accident, conflict and warfare. Local herbs, unique to a particular geographic location, were identified, and certain parts of the plant

formulated into a concoction by herbal practitioners for use by the patient. This approach was very popular until it fell out of favour at the time the germ theory became dominant. Today, herbal medicines are enjoying a revival of interest for a number of very good reasons, such as lack of side effects, better long-term tolerance, cost factors, convenience, personal empowerment and worldview.

Even so, some forms of treatment were excessively intrusive, usually reflecting over-enthusiasm in the healer. They often involved considerable pain, discomfort and even physical trauma. For example, the patient often underwent purging with laxatives and emetics; the skin could be blistered with hot poultices; and bloodletting could be performed. This latter technique was performed either as a treatment for a build-up of excessive humour (called *plethora* or *congestion*), or, as commonly done, as a seasonal tonic. The amount of blood let from the patient usually varied according to the ailment being treated and the enthusiasm or belief of the practitioner. For a patient already weakened by a serious ailment, these attempts at cure could be more threatening than the disease itself. Early in the 19th century, bloodletting was largely discredited in many parts of the world, as their inherent dangers became undeniable. The humoral theory gradually lost favour with physicians.

The decline of the humoral theory

During the early part of the European Renaissance the humoral concept of disease was gradually rejected, and its practice sometimes subjected to violent disagreement. This came about from a series of advances in technology during the 17th and 18th centuries, especially in instrumentation like the microscope and stethoscope, and the observation that in disease the organs are affected rather than the humoral balance. The *anatomical concept of disease* became dominant, and this provided a more direct explanation of the patient's signs, symptoms and pathological organ changes¹⁹.

The decline of the humoral theory accelerated with the introduction of the *theory of specific aetiology*, more popularly known as the *germ theory of disease*. This states that microscopic organisms (viruses, bacteria, fungi and virions) or parasites are the agents directly responsible for disease. Support came from a clinical observation²¹ (by Semmelweis, 1818-1865) which accelerated the decline of the humoral theory. This was that female patients who had just given birth were dying of what was then called childbirth fever, or *septicaemia*. The culprit was identified as an infection, caused by poor attention to hygiene applied by the attending obstetrician. The connection between micro-organisms and disease was made. At roughly the same time, disease was confirmed (by Virchow, 1821-1902) as arising in the body's tissues, rather than the blood supplying them²².

Later, the rise of clinical psychology and psychiatry in the late 19th and early 20th centuries gradually replaced the idea of temperament and its relationship to humours.

The germ theory

The germ theory (or theory of *specific aetiology*) asserts that one specific organism is responsible for each disease. It claims that every disease is the result of a deviation from normal function caused by a pathogen such as a micro-organism or parasite. It was later extended to include genetic abnormality, biochemical malfunction, a developmental problem such as a birth defect, or physical damage. This theory came into prominence in Europe and America from the 1850s, and began a revolution in pathology and medical care. The practice of hygiene and better sanitation, for instance, became major approaches to the treatment of the diseases common at the time. It quickly led to the invention and use of antiseptics. It also explained why diseases were communicable.

The Germ Theory^{23,24}, advocated by Pasteur (1822-1895) and Koch (1843-1910) adopted a *reductionist approach*. It promoted the idea that diseases arose from simple interactions between micro-organisms and the person. It summarily rejected the roles of lifestyle factors, diet, behaviour and other environmental factors in the disease process, because these were essential aspects of the ecological model of health, which drew on the discredited humoral theory.

As the Industrial Age progressed, germ theory developed in a social, cultural, and economic milieu increasingly centred on the values of mass production, mass consumption, standardisation and efficiency. These attributes are perfectly compatible with germ theory and its application. It also brought up the idea of 'the magic bullet'. This means that as each disease has a specific cause, then there must be a specific remedy. This idea is most pronounced in the use of drugs for treating disease: antibiotics for infection; anti-hypertensive agents for raised blood pressure; anti-inflammatory agents for rheumatism, and so on.

Humours and modern medicine

Medical historians see in the humoral theory a fore-shadowing of our modern ideas of metabolic disorders, first described by Garrod²⁵, and the importance of biochemistry in physiology and pathology. The blood group system, pioneered by Landsteiner, is in many ways an extension of the humoral theory. The discovery of hormones and neurotransmitters also suggest that the theory is not yet moribund.

The humoral theory has certainly left its mark on our present-day civilisation. We still refer to persons of good humour or bad humour, and speak of their sanguine, phlegmatic, bilious or melancholic temperament. There are vestiges of humoral theory in current medical language, with *humoral immunity* used when referring to substances such as hormones and antibodies, involved in immunity, which circulate in the bloodstream. The term *blood dyscrasia* is used for a blood disease or abnormality.

Physical destruction by synthetic antimicrobial agents may result in a temporary decline or even (almost) total eradication of the pathogenic microorganism population. However, if the imbalance of the humours is not corrected and maintained, then the disease will recur, either at the original site, or elsewhere in the body. In addition, the effects of these 'new-to-nature' drugs themselves on the humours can be dramatic and far-reaching. They can lead to new humoral imbalances, which in turn brings out short-term side effects and longer-term intolerances.

The bio-psycho-social model of health

This model considers a person's health and disease to be far more than purely biological phenomena, and attaches considerable importance to the influence of psychological and social factors. The *biological* part refers to a person's genetic make-up, nutrition and other lifestyle factors, and environmental quality. This model accepts the role of micro-organisms (as with the germ theory), genetic faults, physical injury and poor development in health maintenance, although considers this only a relatively small part of the big picture. The *psychological* part refers to the person's emotional make-up, spiritual nature, habits and behaviour. The *social* part includes the influences on health of the person's family, community and attitudes. It strongly supports the *mind-body* connection, and its

role in maintaining good health. In many ways it is a modern version of the Tibb Lifestyle Factors. Good health is achieved once all these factors are in harmony.

Summary

The theory of humours was originally described by Hippocrates in ancient Greek times, and occupies a central place in Tibb medical theory and practice. It explains health and disease in terms of the balance between four body fluids: blood, phlegm, yellow bile and black bile. The theory draws on the concept of the four primal elements of earth, water, air and fire, which correspond to the four qualities of coldness, moistness, dryness, and heat. A good state of health is the result of harmony between the four humours, and disease occurs when they are out of balance. The theory also embraces the concepts of Physis, or the body's administrator, the Lifestyle Factors (or *Essential Causes*), and temperament. The theory is simple to understand, robust in its logic, and provides plausible explanation of many phenomena. It understandably occupied a central place in medical philosophy in much of the civilised world for many centuries. The theory also embraces phenomena other than health: microbial infection, the ageing process, the seasons, and even personality. It was virtually unchallenged for millennia and exerted tremendous influence up to the 19th century, especially in the Western world. The concept is present in several traditional medical systems, such as Ayurveda and Chinese traditional medicine. The theory was largely superseded by the advent of the theory of specific etiology, aka the germ theory, and its demise hastened by a series of discoveries in the life sciences. However, there are a number of aspects of its theory and practice, reviewed here, which may lead to a re-evaluation of its relevance and value.

Further reading

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