

OPINION

Bridging ancient wisdom and contemporary medical science: Contemplating on Hippocrates' *Theory of Humours*

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Abstract. Ancient Greek medicine, influenced by religion, attributed disease to divine forces and developed treatments based on faith and the placebo phenomenon. Ancient Greek Medicine, beginning with Hippocrates, was influenced by the pre-Socratic natural philosophers and was based solely on evidence and the use of reason. Hippocrates employed the doctrine of the four humours, which corresponded to the elements 'fire', 'air', 'earth' and 'water', to understand and explain disease and traditional drug action. This system foreshadowed the endocrine and biochemical aspects of human physiology and pathophysiology, and used the homeostatic concepts to explain health as 'eucrasia' (good mixing) and disease as 'dyscrasia' (bad mixing) of the humours. Modern hyper-specialized, precision medicine and hyper-compartmentalized science can still benefit from revisiting ancient wisdom towards a holistic approach, to achieve the 'golden mean' in the consideration of health and disease.

Bridging ancient wisdom (Hippocrates and the four humours) and contemporary medical science

Ancient Greek medicine, influenced by other, receding civilizations, attributed healing powers to gods, such as Apollo and

his son, Asclepius (1,2). In ancient medical centres founded around temples to Asclepius, known as 'Asclepeia', priests applied 'treatments' based on divine faith and the placebo phenomenon. Subsequently, Ancient Greek medicine, 'liberated' from religious influences, was based on evidence and logical thinking (3). It advanced knowledge of physiology, pathophysiology, nosology and rational therapy and was largely attributed to the works and influence of Hippocrates and his school (1,2).

Hippocratic thinking and work were greatly influenced by pre-Socratic philosophers, predominantly including Pythagoras, Alcmaeon, Empedocles and Democritus (1,2). As a result, the Hippocratic doctrine established the clinical images and fixed time periods for the resolution of various diseases (2). Plato and Aristotle combined the significance of number 'four' with the doctrine of the 'four elements, which corresponded to the qualities 'dry', 'cold', 'hot' and 'moist', according to the schematic diagram presented in Fig. 1 (2). The four elements 'fire', 'air', 'earth' and 'water' were rearranged into their qualitative components. These elements corresponded to the four humours of the body: 'Blood', 'phlegm', 'yellow bile' and 'black bile'. These elements were combined to create a complex human personality system (1,2,4). The doctrine of the four humours, further developed by Galen, and Arabian and Persian physicians, influenced the understanding of diseases and the actions of drugs. Remedies and compounds were classified numerically based on their degrees of quality. For example, sugar was classified as cold, warm, dry and moist, while cardamoms were warm, cold and dry (2).

The system of the four humours somehow foreshadowed the endocrine and biochemical aspects of human physiology and pathophysiology (2). It could also be further claimed that this system encompasses an understanding of the homeostatic mechanisms of life. Ancient Greek natural philosophers, beginning with Pythagoras, initially described the concept of a 'steady state' of the body and soul with the words 'harmonious

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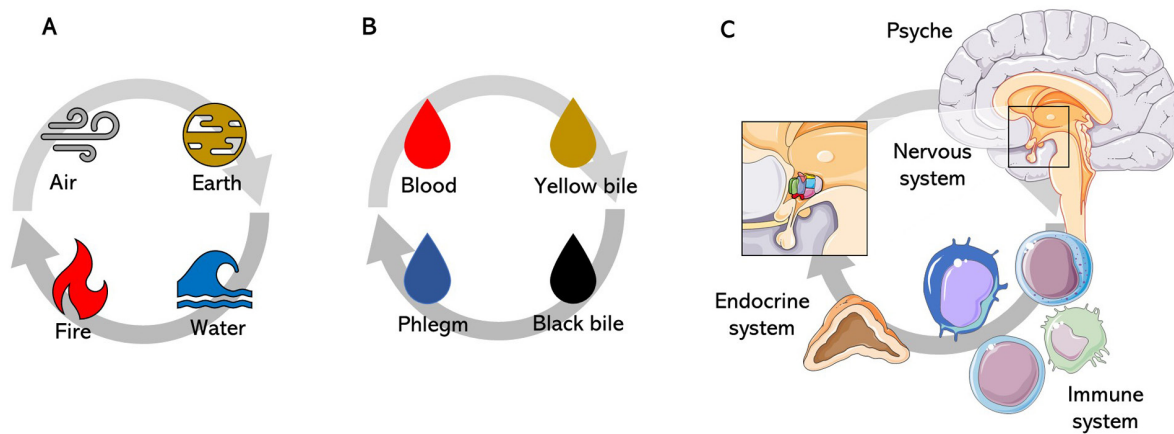


Figure 1. (A) Summary of the ancient theories of the four elements, (B) which in turn inspired the Hippocratic theory of the four humours. (C) Imbalances in the proportions of these caused disease and a proposal of a current date analogy of the regulatory hyper-system, the psycho-neuro-endo-immune axis. Parts of this image was derived from the free medical site <http://smart.servier.com/> (accessed on November 30, 2023) by Servier, licenced under a Creative Commons Attribution 3.0 Unported Licence.

balance' and 'isonomia'. Later, Epicurus referred to 'eustatheia' (eustasis) to express this fundamental concept. Homeostasis, which is derived from the Greek language, meaning 'steady state', was coined in 1930 by Walter Cannon to redefine this key concept at the beginning of the 20th century (5,6).

Galen, an ancient Greek physician, observed that women with 'melancholic natures' had a higher incidence of tumours of the reproductive organs. This observation led to the establishment of a connection between psychological stressors and the development of cancer dating back to the second century CE (7). 'Melancholia', as a term, describes an imbalance caused by excess of black bile (melaina chole) based on the Hippocratic theory of the humours (1,4,8,9). Hippocrates' humoral theory of the pathology of diseases further affected medicine in various ways throughout the medieval period, including Byzantine and Arabic, until the Renaissance and beyond (10).

There are three possible outcomes that may occur as a consequence of the interplay between stressors that disrupt homeostasis and adaptive responses that are triggered by stressors and re-establish it: An ideal match, which causes the organism to return to its basal homeostasis, also known as 'eustasis', an insufficient match, which leads to 'dyshomeostasis' or 'cacostasis', or a perfect match, which leads to a new improved equilibrium, also known as 'hyperstasis', are the three types of matches that may occur when encountering a stressor (5,11,12).

Currently, in the era of modern medicine, when the understanding of biology has grown immensely and technology has provided monumental study tools, an analogy could be performed between the ancient Hippocratic theory of the four humours and the regulatory psycho-neuro-endo-immune supersystem that deals with stress and comprises a huge nexus reflecting the above imbalances (Fig. 1) (11,13-17). Ancient wisdom teaches that to treat the disease of a patient, one should take a holistic approach, considering medicine as both an art and a science. Medicine requires an ethical, humanistic approach, strong compassion, robust factual knowledge, highly interpretive capacities to translate scientific biomedical knowledge,

focus into specific health problems and exquisite judgement (18).

Other key messages from revisiting the thoughts of Ancient Greek Physicians and Philosophers indicate that they were able to successfully and respectfully integrate medical knowledge from other civilizations, for instance Egyptian traditions that potentially preceded the theory of humours of Hippocrates (19), the abandoning of theocratic medicine and other philosophical speculations influenced modern Evidence-Based Medicine, emphasizing thorough history-taking, holistic concepts and understanding human nature rather than speculating (4).

In conclusion, in the era of the hyper-specialized precision medicine and the hyper-compartmentalized science, an integrated re-thinking of biomedical science and a renewed approach to treating the patient rather than the disease, can draw examples from the Hippocratic tradition.

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IGL and GPC conceptualized the study. VEG, IGL, GPC and DAS substantially contributed to data interpretation, and wrote and prepared the draft of the manuscript. All authors have read and approved the final manuscript. Data authentication is not applicable.

Ethics approval and consent to participate

Not applicable.

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Competing interests

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