

The “atomic theory” of Leucippus, and its impact on medicine before Hippocrates

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Leucippus, teacher of Democritus, was the first to describe the “atomic theory” in an attempt to explain the genesis of the matter. Although only a fraction of his work was saved, the “atom”, the smallest and indivisible particle of matter, enclosing a vacuum in which other particles move, still remains the fundamental element of modern physics.

Leucippus (5th century BC, ca 430 BC) (Fig. 1), was born most probably in the city of Avdera, in Southern Thrace, Greece, where also Democritus was born. The island of Milos, the Greek colony in Italy, Elea and the Greek city of Miletus in Asia Minor, were also mentioned as his birthplace [1-4]. He was recognized as the founder of the “atomic theory”, though overshadowed by his student Democritus (ca 460-370 BC), who was considered the pundit, for this theory [5]. Leucippus was the first to describe the “atomic theory” [6-15]. Although these two Pre-Socratic philosophers were not physicians, but mainly physicists, their “atomic theory” had a great impact on ancient Greek medicine, because it offered interesting views about body construction, soul characteristics and research methodology.

According to “atomic theory”, the atoms (in greek: άτομα), the indivisible and unchangeable particles, form the matrix of the universe and everything created is the result of the different order, position and spin of their complex relation. Another important element of this theory is the vacuum. Atom was the synonym of being, while “void” the synonym of not being. Without the endless vacuous space, it could not have been possible for any movement to exist. Constant movement of the atoms (in greek: αεικίνητον: always moving), is another basic element of the “atomic theory”, a never ending phenomenon of continuous union or repel from each other. Movement is the key for the Creation, as the atoms were able to combine in various forms and construct everything else in the world [15-19].

Leucippus was follower of the Ionian Philosophic School (Ionia was called the western, by the sea, greek land of Asia Minor). This school taught the so called naturalistic or realistic philosophy, in oppose to the “Eleatic” School of Greeks in Italy. Leucippus’ was dynamic and pluralistic. He was convinced, that the theory of “one factor alone” was outdated and that a new, progressive, philosophical explanation of various phenomena was needed [20].

Among Leucippus works stand the “Great Cosmology” (in greek: Μέγας Διάκοσμος: About Great Cosmos) and On the Mind (in greek: Περί Νού). Of this second treatise, only one but very significant fragment has survived, where we can read: “nothing is in vain, but everything happens because of a reason and necessity”. This aphorism, not only encapsulates the rationalism of the Ionian Greek school philosophy, but also constitutes the basic axiom of ancient Greek medicine concerning the rational interpretation of diseases and their therapy, which was later taught and described in “Corpus Hippocraticum” [21].

Materialism was the basic element of the “atomic theory”. Democritus, as a student of Leucippus taught that the soul was a part of our body consisted of fine, smooth, round atoms, functioning like “fire” and spread throughout the body. The atoms of the soul could be lost due to atmospheric pressure and were constantly renewed by the process of inhalation. If this loss was greater than the intake or their formation, the atoms of the soul were dispersed and death occurred [22-24].

Leucippus was the first to describe the sense of vision. According to his writings, the object we see is first formed in our eyes’ pupil from the juxtaposition of various colourful atoms, a view still valid [20].

The materialism of the “atomic theory” greatly served the physiology of human body. Human body was greatly respected by ancient Greek physicians and philosophers. Philosophers of the Methodic School, a philosophical school in Ephesus, Asia Minor represented by the philosopher Soranus dealt with the human body. Soranus taught that every disease was the result of obstruction of normal circulation of atoms through the pores of our body [25]. Other philosophers accepted his views [26].

In closing this paper, we may recall that Greek philosophers often liked to dispute what others had said before, sometimes just for the sake of argument or in order to declare their sophisticated ability. This happened for Leucippus too [27]. On the contrary, there is no doubt today that Leucippus was a well known philosopher as mentioned in papyrus Herculaneum (VS 75 A 7) [28]. Furthermore, Theophrastus and his followers in their writings stated that the great treatise “Great Cosmology” was undoubtedly written

by Leucippus [28].

In conclusion, Leucippus gave the world a theory that not only influenced ancient greek philosophical thought and medicine, but still in main parts remains modern, true and intriguing scholars worldwide for further research.

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