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An estimation of the number of cells in the human body

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Abstract

Background: All living organisms are made of individual and identifiable cells, whose number, together with their size and type, ultimately defines the structure and functions of an organism. While the total cell number of lower organisms is often known, it has not yet been defined in higher organisms. In particular, the reported total cell number of a human being ranges between 10^{12} and 10^{16} and it is widely mentioned without a proper reference.

Aim: To study and discuss the theoretical issue of the total number of cells that compose the standard human adult organism.

Subjects and methods: A systematic calculation of the total cell number of the whole human body and of the single organs was carried out using bibliographical and/or mathematical approaches.

Results: A current estimation of human total cell number calculated for a variety of organs and cell types is presented. These partial data correspond to a total number of 3.72×10^{13} .

Conclusions: Knowing the total cell number of the human body as well as of individual organs is important from a cultural, biological, medical and comparative modelling point of view. The presented cell count could be a starting point for a common effort to complete the total calculation.

Keywords: Cell size, human cell number, organ, total cell count, theoretical issue