

## Editorial

**HOW TO REJECT DOGMAS  
AND EMBRACE REAL SCIENCE**

In 1516 AD, the anatomist Mondino de Luzzi from Bologna published his *Anathomia*. He was the first to introduce anatomical teaching with human cadavers. Andreas Vesalius of Brussels (1514-1564), the pioneer of modern anatomy, famous for his masterpiece of Renaissance Anatomy, “*De humani corporis fabrica*” („The Fabric of the Human Body”), first published in 1543, had broken long lasting dogmas in anatomy. Educated on ancient scholars including Hippocrates, Aristotle and Galen, was able to reveal and to reject many dogmas that had been active from the 2nd century AD. Although he remained a Galenist to his dying day, he emphasized his belief that Galen had never dissected a human body. Vesalius himself showed a strong talent for dissection and became a demonstrator for one of his professors. It was probably at this point that he began to appreciate the value of direct visual inspection, and soon started to understand that some of Galen’s descriptions were more closely related to animal than human anatomy [1]. From his earliest days as a professor of surgery and anatomy in Padua, or even earlier when working as a demonstrator in Paris, Vesalius discovered more gaps between Galenic descriptions and real human anatomy. The success of his book could be attributed to his more than 270 woodcut illustrations. The illustration showing his personal appearance, including an oversized head and short, stubby forearms and hands, led us to conclude that he suffered from hypochondroplasia, a condition of short-limb dwarfism [1]. Recently, both editions of the original *Fabrica* have been published by Karger - a modern edition with a total of over 1,400 pages in A3 format, with greatly enhanced illustrations, and an impressive weight of 14 kg [2].

One of interesting Galenic dogmas was that the hypothalamic infundibulum and the pituitary gland represent a draining route for mucus or phlegm (in Latin “pituita”) passing from the brain ventricular parts to the nasopharynx. Perfectionism of the Renaissance genius artists Michelangelo Buonarroti and Leonardo da Vinci obligated them to dissections of human bodies. “Can you imagine there is huge and long snake in the human womb”, wrote Michelangelo [3]. His painting on the ceiling of the Sistine Chapel in the Vatican in Rome uses the hypothalamic-pituitary region as a backdrop to his depiction of the „Creation of Man”. Drawings by Leonardo da Vinci taken from the “Codici di Anatomia” of the Windsor’s collection have three-dimensional representation of the cerebral ventricles. He assigned the third ventricle as “*Sensus communis*”, the site of afference and elaboration of all external and internal signals in the human body [4]. These outstanding contributions are an example of how to reject dogmas and embrace real science and, at the same time, a confirmation of magic interactions between the anatomy and art.

Three-dimensional (3D) printing was first described by Charles W. Hull in 1986, and has been extensively used worldwide over the past 30 years. Due to its precise reconstruction of intricate anatomical structures, there is an increasing use of 3D printing in medical sciences, ranging from basic anatomy to surgical practice and innovative research application [5]. Contemporary medical students in their learning of anatomy during practical lessons use



3D images, CT scans, plastinated specimens instead of hands-on dissection. The future will show how progressive this approach is, in comparison to the *anatomia sensata*.

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### References

1. Garrison DH. Vesalius and the Achievement of Fabrica. Karger Gazette: Anatomy & Art through the Ages 2013; No 73.
2. Karger website: [www.vesalius-fabrica.com](http://www.vesalius-fabrica.com)
3. Stone I. The Agony and the Ecstasy. Alnari: Belgrade, 2004. (Serbian)
4. Lechan RM, Toni R. Functional anatomy of the hypothalamus and pituitary. [www.endotext.org](http://www.endotext.org), Last Update: November 28, 2016.
5. Chen S, Pan Z, Wu Y, Gu Z, Li M, Liang Z, et al. The role of three-dimensional printed models of skull in anatomy education: a randomized controlled trial. Sci Rep 2017; 7(1):575. doi: 10.1038/s41598-017-00647-1

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