



# ISTITUTO E MUSEO DI STORIA DELLA SCIENZA

## Microscopic anatomy

Microscopic anatomy (*fig.1*) began during the course of the 17th century with Federico Cesi (1585-1630) (*fig.2*) and Francesco Stelluti (1577-1651) in the *Apiarium* (Rome, 1625) (*fig.3*), a work covering a single folio of extraordinary size, containing detailed descriptions of naturalist, historical-erudite and literary nature on bees.

Later, Giovanni Battista Hodierna (1597-1660) published, in *L'occhio della mosca* (Palermo, 1644) (*fig.4*), a text dedicated to the anatomy of insects, a masterly example of naturalist research conducted with the aid of the microscope; Marco Aurelio Severino (1580-1656) (*fig.5*) in his *Zootomia Democritaea* (Nuremberg, 1645), justly considered the first treatise on comparative animal anatomy, proposed an atomistic conception of animal structures developed on the basis of microscopic observation. (*fig.6*)

Gradually, the microscope (*fig.7*) helped to disclose the causes of the functioning of organisms (*fig.8*) which were explained by extending to the biological sphere the rigorous style (*fig.9*) of geometric analysis employed by Galileo (1564-1642) in studies on mechanics. This aspect was developed especially by René Descartes (1596-1650) (*fig.10*) and by Giovanni Alfonso Borelli (1608-1679) (*fig.11*). The latter, in particular, described in a mechanical perspective the muscular movements involved in walking, running (*fig.12*), and lifting weights (*fig.13*) as well as the internal motions of the body.

Microscopic anatomy was however developed in all of its potentiality by Marcello Malpighi (1628-1694) (*fig.14*). As Galileo (*fig.15*) had launched exploration of the great machine of the universe with the telescope (*fig.16*), so Malpighi aimed to reveal the hidden structure of the machine that was the human body with the microscope (*fig.17*). He observed the alveolar structure of the lungs (*fig.18*), the papillary receptors on the tongue (*fig.19*), the connection between arterial and venous blood vessels (*fig.20*), identified the red blood cells and described precisely the first stages in the embryonic development of a baby chick. (*fig.21*).

The combination of "thin" anatomy and microscopic magnification soon led to a succession of remarkable discoveries (*fig.22*) Thomas Bartholin (1616-1680) (*fig.23*) identified the lymphatic ducts (*fig.24*); Lorenzo Bellini (1643-1704) (*fig.25*) revealed the structure and function of the kidneys (*fig.26*), furnishing an explanation of the mechanical type; Francesco Redi (1626-1697) (*fig.27*) illustrated the extraordinarily complex organization of insect life (*fig.28*); Thomas Wharton (1614-1673) formulated the theory of the glands as secretory organs (*fig.29*); Niels Steensen (1638-1686) (*fig.30*) conducted accurate microscopic observations of muscle fibers; Thomas Willis (1621-1675) (*fig.31*) e poi Albrecht von Haller (1708-1777) (*fig.32*) studied the structure of the nervous system and the dynamics of neuro-muscular functions (*fig.33*).

## Images

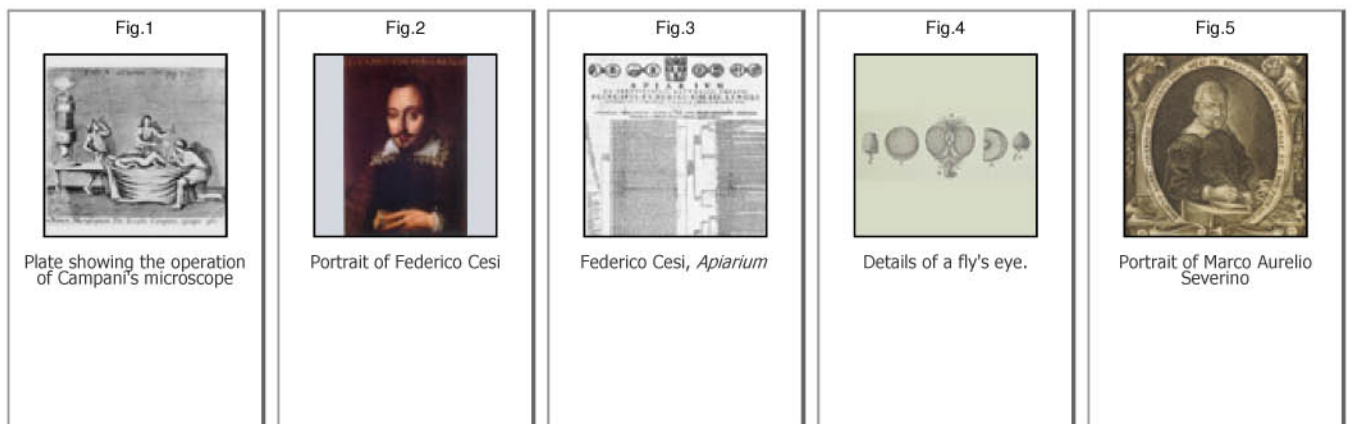


Fig.6



Marco Aurelio Severino, *Zootomia Democritaea*

Fig.7



Microscopio composto galileiano

Fig.8



G.A. Borelli, *De motu animalium*

Fig.9



G.A. Borelli, *De motu animalium*

Fig.10



Portrait of René Descartes

Fig.11



Portrait of Giovanni Alfonso Borelli

Fig.12



G.A. Borelli, *De motu animalium*

Fig.13



G.A. Borelli, *De motu animalium*

Fig.14



Portrait of Marcello Malpighi

Fig.15



Portrait of Galileo Galilei

Fig.16



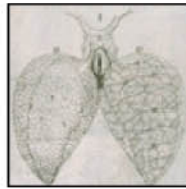
Galileo showing the Medicean planets to the personifications of Optics, Astronomy and Mathematics. Galileo Galilei, *Opere*, Bologna, 1656. Antiporta.

Fig.17



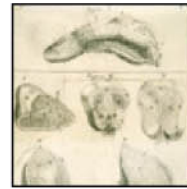
Marcello Malpighi, *Opera omnia* - Frontispiece

Fig.18



Anatomical plate representing the pulmonary alveoli, detail

Fig.19



Anatomical study of the structure of the tongue

Fig.20



Anatomical plate representing the pulmonary alveoli, detail

Fig.21



Digital processing image of the stages of embryonic development of a baby chick

Fig.22



Frontal representation of the human trunk, with view of the internal organs

Fig.23



Portrait of Thomas Bartholin

Fig.24



Frontal representation of the human trunk, with view of the internal organs

Fig.25



Portrait of Lorenzo Bellini

Fig.26

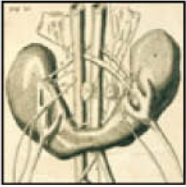


Table of human anatomy showing the renal canals

Fig.27



Portrait of Francesco Redi

Fig.28



Mosquito, watercolor

Fig.29



Plate illustrating the 'glandula maxillaris' and the 'ductus salivaris'

Fig.30



Portrait of Niccolò Stenone

Fig.31



Portrait of Thomas Willis

Fig.32



Portrait of Albrecht von Haller

Fig.33



The arteries of the mesenterium