

Mariano GactoDepartment of Genetics and Microbiology,
University of Murcia, Spain

Correspondence to:

Mariano Gacto. Department of Genetics
and Microbiology. Faculty of Biology. University
of Murcia. 30071 Murcia. Spain.
Tel.: +34-968367132. Fax: +34-968363963.
E-mail: maga@fcu.um.es

The bicentennial of a forgotten giant: Lazzaro Spallanzani (1729–1799)

Two centuries ago Lazzaro Spallanzani (Fig. 1), a true precursor of modern biology and one of the “founding fathers” of microbiology, died. In general, he is comparatively less known than other great scientists. However, we have to recognize today that many aspects of our current scientific culture are based in his inspiration. This Italian, born in Modena, was a follower of the great naturalist Antonio Vallisnieri (1661–1730) and attended lectures by the famous Laura Bassi (1711–1778), who, in spite of her sex, was a full professor at the University of Bologna in the middle of the eighteenth century. This extraordinary woman—who spoke several languages, possessed an unusual knowledge of mathematics, physics and natural sciences, and still had time to bear twelve children—inspired the scientific vocation of the young Spallanzani. Triggered by these stimuli, Spallanzani became professor of natural history at the Universities of Modena and Pavia and later a researcher renowned throughout Europe by the multiplicity and curiosity of his observations. Since he was ordained by the Roman Catholic Church, he is also known by the nickname of *abate* Spallanzani.

Spallanzani’s classic studies on the impossibility of spontaneous generation of life from dead matter contributed to the setting up of techniques on sterilization later perfected by Louis Pasteur [1, 2, 4]. Pasteur, acknowledging the importance of these studies, hung Spallanzani’s portrait in one of the halls of his Institute at Paris. Furthermore, the versatility of Spallanzani’s research contributed quite efficiently to the progress of physiology in areas as diverse as blood circulation, breathing and digestion [2, 3]. Among his many scientific achievements, the most outstanding discoveries are by far the various contributions included in his book *Experiences to Serve to the History of the Generation of Animals and Plants*, which was first published in Genova, in Italian, in 1786 [6]. The experiences described are of great interest, particularly when analyzed in the light of modern techniques such as cloning or in vitro fertilization. Among other accomplishments, these studies report the first experimental evidence that ovules are fertilized by spermatozoa. However, as scientists in all ages, Spallanzani was not immune to error. Prisoner in part of

Aristotle’s ideas, he favored some wrong interpretations of the pre-formationist theory, which supported the pre-existence of the embryo before fertilization and assumed a sole animistic role for the spermatic fluid [5]. Nevertheless, we owe to Spallanzani the first studies on reproduction which can be considered really modern.

By means of artificial fecundations in various animals, Spallanzani was able to obtain embryos which “were born just as if mating had preceded their life” [6]. On these bases, he

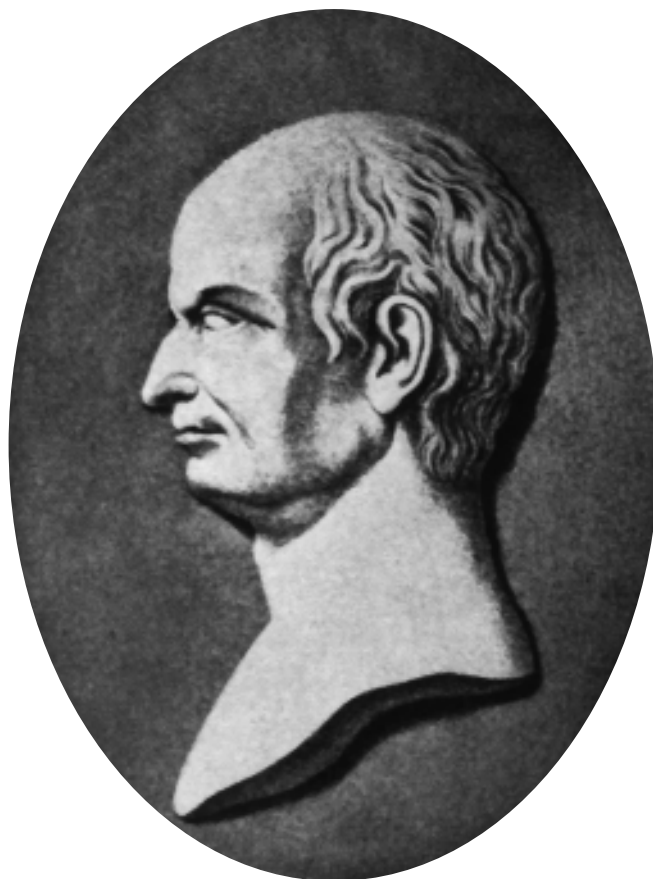


Fig. 1 Lazzaro Spallanzani (1729–1799)

tried to obtain not only hybrid animals but also imaginary beings, such as the famous onotauro, an animal supposed to be the result of breeding between a bull and a mare or a horse and a cow. He thought that “Nature always responds to questions with instructive answers”, hence he managed to learn valuable lessons even when he met with failure.

His scrupulous thoroughness in the performance of experiments, his wide and imaginative ability to design them, and his exquisite precaution to interpret the results were characteristics of Spallanzani’s personality. He clearly showed traits that are typical of current scientists rather than of ancient naturalists. His method of repeating experiments several times, for instance, met with serious criticism among his contemporaries, and even the famous English surgeon John Hunter (1728–1793) was of the opinion that he multiplied unnecessarily the experiments with no known purpose [6]. Such an approach, however, allowed him to reach conclusions that are still valid after centuries.

Part of Spallanzani’s work has nowadays the freshness of modernity. The best way to pay tribute to his memory is to finish these paragraphs by using his own words. The reflections found at the end of his *Second Report on Artificial Fertilization in some Animals* [6] are both prophetic and charming. Moreover, they enclose the concern and wonder of the scientist who faces

for the first time something important and unknown: “My last discoveries lead me to believe that animals can be born without the concurrence of the two sexes provided one takes care of the conditions needed for the success of the experiment. I can not avoid the feeling of admiration that these phenomena arise on me and, as Pliny said, I have to recognize that after watching Nature nothing incredible can be thought about her” [6].

References

1. Brock TD (1975) *Milestones in Microbiology*. Washington, DC: American Society for Microbiology, pp 13–16
2. Caullery M (1957) Les sciences biologiques du milieu du XVII a la fin du XVIII siècle. In: Daumas M (ed) *Histoire de la Science. Encyclopédie de la Pléiade. Vol V*. Paris: Librairie Gallimard, pp 1178–1202
3. Guyenot E (1941) *Les sciences de la vie au XVII and XVIII siècle*. Paris: Albin Michel Ed
4. Kruif P de (1986) *Cazadores de microbios*. Barcelona: Salvat, pp 25–55
5. Rostand J (1966) *Introducción a la historia de la Biología*. Madrid: Editorial Península
6. Spallanzani L (1786) *Experiencias para servir a la historia de la generación de animales y plantas*. In: Muñoz J, Leloir LF, Braun E (eds) *Maestros de la Ciencia*. Buenos Aires: Emecé Editores, Edición de 1945. Translated from Italian