

# Analysis of Professor Ioan Drăgoiu's Opening Lecture at the Chair of Histology from the Cluj Faculty of Medicine, Romania

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## Abstract

One of the personalities who marked in a positive way the evolution of Romanian histology was Ioan Drăgoiu (1873–1941). Unfortunately, after nearly three quarters of a century after his death his name is not sufficiently known, both in Cluj (where he had the most significant part of his career), as well as in whole Romania. He was the first full professor of histology who devoted himself to the Romanian Faculty of Medicine from Cluj, where he worked from 1924 until 1941. During this period, he created a school of histology, among his disciples being Cornel Crișan (1895–1958) and Iosif Mihalca (1906–1981). The most important achievement of Drăgoiu was his complete histology textbook, which was a premiere in the Romanian scientific literature. The title is "Histological Elements and Microscopic Techniques" (1931–1933). Our paper presents the opening lecture of histology, held by Drăgoiu on January 19, 1925 at the Faculty of Medicine from Cluj. Although this lecture is neglected, it represents a very significant document in which Drăgoiu gave arguments concerning the role of histology in the curricula of medical faculties. It also reveals his conception about the usefulness of correlating the notions of histology with those of physiology. A special part of this lecture was focused on the presentation of the majority of the most important masters of histology from the past.

**Keywords:** Ioan Drăgoiu, Opening Lecture, Histology course, Faculty of Medicine from Cluj.

## Introduction

Morphological sciences have a complex history, which was marked by different discoveries and scientific personalities. Analyzing from the medico-historical point of view this domain in the Romanian human medicine, it is evident that only part of these personalities were appreciated during their lives and remained well known after their death. In this category, can be mentioned: Victor Babeș (1854–1926), Francisc Iosif Rainer (1874–1944), Victor Papilian (1888–1956), Grigore T. Popa (1892–1948), Ioan Iancu (1902–1992), etc. Unfortunately, even the prestige of other important professors was significant along their lives, after their death their names were gradually less often evoked, in such a way that they become insufficiently known at the beginning of the 21<sup>st</sup> century. Some examples are evocative: Mihail Petrini-Galatz (1846–1926), Paul Petrini (1847–1924), Aristide Peride (1848–1906), Ion Nubert (1886–1975), Alexandru Țupa (1886–1956), Cornel Crișan (1895–1958), Rubin Popa (1901–1958), Augustin Mureșan (1908–1985), etc.

## Professor Ioan Drăgoiu (1873–1941)

Nowadays, after nearly 75 years since Ioan Drăgoiu (1873–1941) died, his name belongs to the group of masters of morphology who are underrated. This is an abnormal situation, keeping in mind minimum two of his achievements. The first one was that he wrote the textbook entitled "Histological Elements and Microscopic Techniques" (1931–1933), which was a premiere in Romanian scientific literature. The second was that he created a school of Histology at Cluj, among his disciples

being Cornel Crișan and Iosif Mihalca (1906–1981). Drăgoiu realized these achievements during his constant and tireless activity held at the Cluj Faculty of Medicine. One of his merits was that he remained faithful for 17 years to the Department of Histology of this Faculty. Drăgoiu's situation was reverse to that of his predecessor – Prof. Petru Gălășescu (1870–1938) – who activated in the medical academic staff from Cluj only one year, 1923/1924. Before this short period, at the beginning of the 1920/1921 academic year, the leadership of this Chair was offered to a French scientist – Paul Christian Champy (1885–1962). However, for different reasons, this invitation was not put into practice [1]. To solve the problem of having no titular at this chair, the courses of Histology for medical students were held by Prof. Ioan A. Scriban (1879–1937), in parallel with those for the students of the Faculty of Science from Cluj, where Scriban was full Professor [2]. Thus, Drăgoiu was the only full Professor who constantly activated at the Histology Chair of the Faculty of Medicine from Cluj during the interwar period.

Our paper presents an aspect rarely discussed in Drăgoiu's didactic activity: his Opening Lecture held at the Romanian Faculty of Medicine from Cluj on January 19, 1925.

In a general understanding, an opening lecture is intended to be a special event in a didactic community. Its protagonist can have a real success if he uses his rhetorical qualities. However, from the ethical viewpoint, it should be known that the ideas presented in an opening lecture should be put into practice, if not all of them, at least the most significant aspects. Drăgoiu was a positive example in the application of the ideas launched at this

Opening Lecture throughout his career held in Cluj, between 1924 and 1940. He continued to deploy them in Sibiu, since 1940 until his death – in 1941. In this town, the Faculty was in refuge during the Second World War. He worked with all his conscientiousness and ability of scientist and he taught his students with all devotion, adopting constantly ethical principles. He pledged to form “students whose mission is as scientific as moral and patriotic” [3]. This statement should be followed all times.



*Professor Ioan Drăgoiu (1873–1941).*

Professor Drăgoiu’s Opening Lecture was attended by students and many members of teaching staff of the Faculty of Medicine: the dean Professor Iuliu Moldovan (1882–1966), professors, lecturers and assistants from different chairs of the Faculty. This large attendance was the proof that Drăgoiu’s prestige was well-known in Cluj. However, the audience had also the curiosity to analyze Drăgoiu’s Lecture, because he was not a human physician, but a veterinarian. At that time, veterinarians were viewed with skepticism by the majority of human physicians.

At the beginning of his Lecture, I. Drăgoiu expressed his gratitude for Prof. Moldovan. Drăgoiu mentioned that “I express my thanks for the honor you show me attending the opening of this course. Your presence here is a proof of the interest you give to Histology and, in the same time, a proof of confidence you show me, for which I feel very honored” [3]. These words were a demonstration of the his respect for Moldovan, as he knew Moldovan’s impressive activity as general secretary of the Resort of the Social Affairs in the Ruling Council of Transylvania between 1918 and 1920. Another reason for Drăgoiu’s appreciation for Moldovan consisted in the fact that Moldovan was the only Romanian physician docent of Vienna Faculty of Medicine.

During the same part of his Lecture, Drăgoiu also expressed his gratitude to all professors of the Faculty of Medicine from Cluj, especially for the unanimity they voted him as full professor at the Chair of Histology.

This was true, but that moment was the happy end of contradictory discussions, in which some professors were against the principle for inviting veterinarians as professors at a Faculty of Human Medicine. Drăgoiu thanked for the opportunity given him to be recognized “worthy” of the status of member of Faculty of Medicine from Cluj: “Thank you all for the unanimity with which you have called me here and please believe me that this unanimity, which opens in front of me a serene atmosphere, gives me the courage to work with all the passion I am capable for the educational system’s interests” [3]. Perhaps the term of “serene atmosphere” was a bit exaggerated, due to fact that at that time in Cluj life was not very pleasant, due to various causes, the most important being the consequences of the First World War.

Ioan Drăgoiu revealed that he had the wide experience of 20 years in histology and therefore was able to offer to the students “the fundamental knowledge necessary to understand physiology and pathology, sciences which, in their turn, open the path for learning all pathologies” [3]. It should be noted that his experience was not only in histology, but it was a complex experience in physiology, histology and embryology. To understand the sources for his experience, we will mention some data regarding his scientific background. Between 1896 and 1901, he was student at the High School of Veterinary Medicine from Bucharest. It is useful to underline that although it had the name of school, it designated a higher education. This school was founded in 1861, by Carol Davila (1828–1884), who contributed to the prestige of this institution. It was transformed into the Faculty of Veterinary Medicine after 60 years of existence, in 1921 [4].

Being very appreciated by his professors, in just two years after his graduation, Drăgoiu was hired lecturer at the Chair of Physiology of the same institution of higher education from Bucharest. The head of the Chair was Professor Ioan Athanasiu (1868–1926), who remained in the history of science as one of the founders of modern Romanian Physiology. The cooperation between I. Athanasiu and I. Drăgoiu lasted for more than two decades (until 1926, the year when the master died). The initial training of Drăgoiu in physiology helped him to appreciate the role of morphology in creating the basis for a scientific understanding of human life. In this context, during his above-mentioned Opening Lecture, he thanked to Prof. Athanasiu, “because he initiated him in the scientific research and in training and gave him the honor of being his collaborator”. Actually, the training of Drăgoiu in morphology was due to his attendance to the postgraduate studies at the Collège de France (in Paris), during the period 1919–1923. At that time, the director of the Laboratory was the famous scientist Louis-Félix Henneguy (1850–1928). In the same inaugural Lecture, Drăgoiu paid homage to Professor Henneguy and thanked him for his hospitality and kindness. The experience as embryologist was of great benefit for Drăgoiu, because in the interwar period he done different embryological experiments. It is interesting to mention that at that time the Chair of Histology from the Cluj Medical Faculty had a component of embryology and its official name was “Histology and Embryology Institute” [5]. Returned back to Romania, in 1923 Drăgoiu

was promoted Associate Professor at the same Chair of the High School of Veterinary Medicine from Bucharest. He was 50 years old.

Continuing the analysis of his Opening Lecture, it is useful to put into light his overview done on the Histology evolution. His aim was to reveal the respect for the masters of this field of science. However, his presentation was not a medico-historical one, because he did not give attention to all the great names from the past of Histology, nor to the majority of their achievements. It is interesting to analyze this Lesson because it can be observed that Drăgoiu put on the first plan a detailed exposure of cytological acquisitions and on the second plan a selected exposure of the histological discoveries. He did little attention to the connections between Histology and Pathology. Consequently, he did not insist on the fact that researchers, during different centuries, investigated in parallel the normal morphology with the pathological changes of organs and tissues.

For the students who attended to his lecture, Ioan Drăgoiu insisted on the fact that Histology was a science founded only in modern times. He pointed out that neither in Antiquity, nor in the Middle Ages, or not even in the Renaissance – in the times of Galileo Galilei (1564–1642) – existed data about the texture of organs.

Even in Drăgoiu's Opening Lecture are many interesting aspects, we do not want to do an exhaustive analyze of it. We will comment some of the discoveries that he held out at his opening lecture, because some of them are almost forgotten today.

Methodically, he divided the evolution of histology into two periods. The first started in the 17<sup>th</sup> century and ended in 1839, when Theodor Schwann (1810–1882) enunciated the cell theory. The second period began with Schwann and was continued in the contemporary times.

Regarding the first period of Histology, Drăgoiu considered necessary to mention the initiators and creators of microscopic sciences. He underlined the fact that they opened the era of observations on the structure of plant and animal organism. The first observations were done using rudimentary methods of dissection and dissection, by employing the compound microscope invented in late 16<sup>th</sup> century by the Dutch optician Zaharias Jansen (c. 1580–c. 1628).

Referring to Anthony van Leeuwenhoek (1632–1723), Drăgoiu noted that he was “an amateur endowed with amazing ability to build his own increasing instruments and with the curiosity to examine everything falling under his hands: nucleated red blood cells, nervous fibers, striated muscle fibers, infusorians, vinegar vibrios (...), flea development from egg up to adult form” [3]. Drăgoiu mentioned that Leeuwenhoek's studies on spermatozoa were done having the help of Luis Ham, who was student in medicine. We believe that the attribute of “amateur” is pejorative, because during the entire life Leeuwenhoek wrote to the Royal Society of England (to which he was a Fellow elected in 1680) and to other scientific institutions, 560 letters describing his discoveries and observations. Indeed, this contribution in the prelude of Histology was very useful, but his name cannot be included among histologists. The argument for this point of view was given at the beginning of the 20<sup>th</sup> century by Charles Green

Cumston (1868–1928), who underlined that Leeuwenhoek created the micrography [6]. Thus, Drăgoiu correctly included Leeuwenhoek in the period of the prefiguration of Histology.

Then, Drăgoiu exposed the principal discoveries of Marcello Malpighi (1628–1694): vascular glomerulus of kidney, hepatic lobules, splenic (lymphoid) nodules, mucous corpus of skin, capillaries in animals, pulmonary capillary network, the development of chick embryo in egg from the first day until hatching, respiratory system and excretory systems of insects and sericigen system of silkworm. He pointed out that Malpighi discovered the smallest constituents of plants, which he named “utricule” or “sacculi”. Interestingly, Drăgoiu did not designate Malpighi as a “veritable fonder of Histology” as he is considered and named in some of the contemporary history of medicine treatises [7]. Indeed, few medico-historians appreciated during the 20<sup>th</sup> century and even at present that Malpighi was the founder of Histology. However, Drăgoiu was right. Many medico-historians – for example René Aphonse Dumesnil (1879–1967) during the interwar period – put into the light that “before Bichat [...] the tissular anatomy or histology existed only in fragmented way, imperfect and so to say latent” [8].

Drăgoiu cited also the name of Robert Hooke (1635–1703), specifying that he noticed few years earlier than Malpighi the presence of multiple “empty cavities” in the structure of plants, which he named “cells”. Drăgoiu should have given more details about the achievements of Hooke. For example, it would have been useful to quote the title of his book – “Micrographia” –, which had a great success at that time. This book determined different medico-historians to consider Hooke as theoretician of microscope [9].

Discussing briefly the contribution of François Xavier Bichat (1771–1802) in Histology, Drăgoiu revealed that Bichat had the merit of having collected and systematized all descriptions made in this domain before him. Based on these data, he associated similar cells in an intercellular matter and described 21 tissues. Grouping tissues, he obtained the organizational systems performing specific functions in an organism. In the book entitled “Traité des membranes” (1800), he presented the physical, chemical, and functional properties of tissues, but also their alterations and pathological reactions. Mentioning another Bichat's treaty, entitled “Anatomie générale appliquée à la physiologie et à la médecine”, Drăgoiu stressed that its author succeeded to classify diseases of various organs on the affected tissular components. We should add that even Bichat's conception about tissues was very modern for that time; it was prefigured by some results of the researches done by Albrecht von Haller (1708–1777) and Théophile de Bordeu (1722–1776) [10].

It is interesting that Drăgoiu failed to mention the name of Giovanni Battista Morgagni (1682–1771), although it would have been usefully to point out that Bichat realized the bridge between the Pathological Anatomy of Morgagni to the Cellular Pathology, elaborated later by Rudolf Virchow (1821–1902) (as noted Roy Porter) [11]. Similarly, Drăgoiu did not evoke the name of Friedrich Jakob Henle (1809–1885), who was the author of book entitled “Allgemeine Anatomie”, which is consi-

dered the first systematic work of Histology, following the moment when the cell theory was created [12]. Douglas Guthrie (1885–1975) remarked in a very significant way that: “Bichat had laid the foundation of Histology. Henle proceeded to build the edifice. The simile is appropriate, as Henle, in his excellent « Handbook of Systematic Anatomy », viewed the human body from an architectural standpoint. This handbook describes the macroscopic and the microscopic structures of the entire body” [13].

A short, but interesting part of Drăgoiu’s Opening Lecture was focused on the contributions in the perfection of lens. Thus, he noted the role of Hermanus van Deyl in the commercial fabrication of achromatic lens (1807). Also, Drăgoiu reminded the name of Joseph Fraunhofer (1787–1826), who constructed in 1811 a new kind of furnace for obtaining special types of glass. Both achievements allowed the developing of cell studies. These accomplishments were done in a moment when Histology was in a slow progress, due to two major defects of microscopes. First of all was the chromatic aberration, which produced iridescent circular diffusion images in the microscopic field. The second defect was the insufficient luminous flux, caused by large losses of light intensity. These problems were gradually solved between 1820 and 1840, by the introduction of achromatic lenses and the condenser lens. This progress was considered by some medico-historians (*e.g.*, Roger Dachez) as being the “real start” of the microscopic studies [14].

Continuing his Opening Lecture, Drăgoiu enumerated different contributors to cellular theory. Thus, he noted the most important contributions of François-Vincent Raspail (1794–1878), who was one of the founders of the cell theory in Biology. In 1827, he elaborated the first notions about cell individuality. Ten years later, René Joachim Henri Dutrochet (1776–1847) argued that both animal and vegetal tissues derived from cell.

From the underrated contributors to the Cytology’s progress, Drăgoiu recalled the name of Félix Dujardin (1802–1860), who revealed in 1835 that the vesicle (corresponding to cell) contained inside a gelatinous substance. He named it “sarcoide”, a term that was replaced in 1846 by Hugo von Mohl (1805–1872) with the name “protoplasm”. Previously – in 1830 – Jan Evangelista Purkinje (1787–1869) discovered in the center of hen egg yolk a refractive oval corpuscle. The same cellular component was described in 1831 by Charles-François Brisseau de Mirbel (1776–1854) and Robert Brown (1773–1858) at plants. This component was named “nucleus” by Matthias Jacob Schleiden (1804–1881). Drăgoiu mentioned that the Schleiden (who was botanist) was one of Schwann’s predecessors in the foundation of cell theory.

Commenting the second period of Histology evolution, Drăgoiu stressed that it started with Theodor Schwann, who formulated the cell theory in 1839. Recognizing that different nuclear structures from animals cells were similar to those described at plants, Schwann pointed out that all matters things are composed of cells. His studies opened the way for many cell researches. Thus, in the following years Rudolf Albert von Kölliker (1817–1905) revealed that all components of an organism have a cellular origin. Arguments about the cell origin from

the division of pre-existing cells were offered in 1846, by Mohl and in 1852, by Robert Remak (1815–1865). In 1857, Rudolf Ludwig Karl Virchow (1821–1902) enunciated the famous axiom “Omnis cellula e cellula” (each cell [comes] from a cell). This singular note about Virchow was, perhaps, insufficient considering the ensemble of his fulfillments. It would have been useful for Drăgoiu to remember that Virchow founded the Cellular Pathology and also the Comparative Pathology. Also, Drăgoiu could mention that Virchow advised his students to use the results of microscopic examinations in their medical thinking [15].

From this point of his Lecture, Drăgoiu did not continue to present the contributions of cytologists to Histology, but switched his presentation by highlighting some histological techniques. He focused his attention mainly on nerve structures staining. He emphasized that in 1858 Joseph von Gerlach (1820–1896) used carmine as histological stain. This method had a great disadvantage: it was impossible to do the differentiation between conjunctive elements and nervous structures, because all became red [16]. Then, Gerlach observed the protoplasmic expansions of neuronal cells can be identified using gold and potassium dichromate. This achievement allowed him to launch in 1871 the reticular theory. It is interesting to note that this theory was criticized by Wilhelm His (1831–1904), who suggested that nerve cells had “free endings in the central nervous system’s grey matter” [17]. The neuron theory was formulated in 1891, by Wilhelm Waldeyer (1836–1921). However, Drăgoiu did not mention the name of His or of Waldeyer. Perhaps Drăgoiu considered their realizations being too new, or too difficult to be understood for students.

In 1860, Otto Friedrich Karl Deiters (1834–1863) put into evidence the “axis cylinder” (named afterwards axon) and the “protoplasmic processes” (term changed into dendrites) of nerve cell and postulated that the protoplasmic processes can fuse to form a network.

Drăgoiu featured that Camillo Golgi (1843–1926) made a significant step ahead by discovering the silver nitrate impregnation for nervous tissue and by identifying the intracellular reticular apparatus (in 1898). Drăgoiu did not specify that Golgi described the nervous system as a continuous single network. However, Drăgoiu put into evidence the greater merit of Santiago Ramón y Cajal (1852–1934), who demonstrated, using silver nitrate and potassium dichromate, that the relationships between nerve cells were not continuous, but contiguous. Drăgoiu did not point out that C. Golgi and R. y Cajal won the Nobel Prize for Medicine and Physiology in 1906, for their researches in the morphology and physiology of the central nervous system.

Among the selective nervous tissue staining, Drăgoiu mentioned also the use of methylene blue. This dye was discovered by Franz Nissl (1860–1919), who revealed the so-called “Nissl bodies” in the neuronal cytoplasm. It would have been desirable for Drăgoiu to suggest that “Nissl bodies” can change under various physiological and pathological conditions.

Referring to the role of microscopy in the physiological studies, Drăgoiu noted the contributions of Antoine Ranvier (1835–1922) and Arthur van Gehuchten (1861–1914).

As Drăgoiu endorsed, Ranvier was the first physician who used experimental methods in Histology. For him, the microscope became a “physiological instrument”.

Ioan Drăgoiu described briefly some experimental researches in which microscopy was used for explaining the functions of cells, tissues, organs and body systems, such as microscopic analysis of muscle contraction.

A special place in Drăgoiu's Opening Lecture was offered to Claude Bernard (1813–1878), because he had revealed that the phenomena arising in an organ were the result of phenomena that occur in its constituents. Drăgoiu remarked that under the influence of Cl. Bernard Histology emerged out of its observational and descriptive character and became a physiological science. Drăgoiu emphasized that the cell became the morphological and the physiological unit of life. In this context, appeared Histophysiology.

Continuing his Opening Lecture, Drăgoiu presented some details of cells constituents, which could not be put into evidence using the power of optical microscopes. He insisted on the fact that these details could be reveal by the ultramicroscope. For example, he enlisted components of cytoskeleton and organelles, as Golgi apparatus, mitochondria, chloroplasts, peroxisomes and lysosomes.

He pointed out the usefulness of cultivating and later examining certain types of cells. He also noted few aspects on the histochemical, embryological studies, etc.

It is interesting that he also made some considerations regarding the morphological aspects of heredity. Perhaps he had not enough time to give some significant details about these notions (because the time for his Lecture was not a very long one).

Towards the end of his Lecture, Drăgoiu gave attention to some of the most important Romanian scientists, who carried out histological studies. We will mention them in the chronological order (not in the order enumerated by Drăgoiu). Alexandru Obregia (1860–1937) focused his attention in crating a new method for the adhesion of paraffin sections on the microscope slide, using dextrin. Ioan Cantacuzino (1863–1934) did important researches on the invertebrates' blood cytology. Gheorghe Marinescu (1863–1938) and Ion Minea (1878–1941) studied the structure of the nerve cell and the nerve cell culture. They also made researches concerning nerve regeneration and nerve degeneration. Dimitrie Voinov (1867–1951) made experiments concerning cell division in cartilage. He worked also on the phenomenon of cell division in spermatogenesis. Dimitrie Călugăreanu (1868–1937) elaborated papers about fishes' intestinal epithelium, having respiratory function. Ioan Athanasiu did studies about the histophysiology of smooth and striated muscle tissues. He made researches on the histophysiology of the motor system from insects' wings. Emil Racoviță (1868–1947) made researches on the polychaetes' cephalic lobe. Petru Gălășescu had contributions in the glial cells staining technique. Gheorghe Zotta (1886–1942) studied different aspects of the invertebrates' blood.

The short presentation of these contributions in the foundation of Romanian Histology was not complete. However, it would have been impossible for Drăgoiu to give many examples, because his Opening Lecture was not focused on the history of Romanian Histology.

Ending his exposure, Drăgoiu marked the importance of histological notions in the assembly of medical sciences. He did not give explanations, but he put more rhetorical questions, such as: Can be explained the role of blood phagocytes without knowing the diapedesis phenomenon? How to explain the liver function (*e.g.*, bile secretion and glycogen storage/release) if its components and structure are unknown? How to understand the tissue alterations if its normal structural architecture is unknown? How do a uterine curettage if the uterine layers and the endometrium structure are unknown?

Eventually, Drăgoiu briefly presented the way in which students can acquire the knowledge of Histology. In his opinion, theoretical courses – having demonstrations and projections – must be associated with practical works. During the practical activities, students need to prepare their slides, performing the necessary histological technique. They also need to examine the microscopic slides and to draw the structures they had put into evidence in their notebooks.

At the end of our paper, we will point out some conclusions regarding Drăgoiu's histological Opening Lecture. His lesson was complex, well structured and was focused mainly on the evolution of Cytology. In his presentation, he combined in an original way the data of Cytology with the most significant discoveries of universal histologists. He also added some achievements of Romanian scientists in this field.

Because Drăgoiu did not mention some full names and years of life for different scientists cited in this Lecture, we completed the absent data. Perhaps he did not want to make difficult his exposure, when it was published in the “Medical Cluj” Journal. Our completion was done for respecting the medico-historical rigor, but also because some names of cytologists and histologists became nearly forgotten.

#### Conflict of interests

The author declares that he has no conflict of interests.

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