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АКТУАЛЬНІ ПИТАННЯ ТЕРЕТИЧНОЇ ТА ПРАКТИЧНОЇ МЕДИЦИНИ

Topical Issues of Clinical and Theoretical Medicine

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at room temperature, which refers to the liquid sector of interstitial fluid. The data about the water fractions part show that the pathological bioapatite is unequally distributed in the walls of a vessel.
Conclusions. The following method of studying the homogeneity of pathological biomineral can help to determine the mechanism of depositing of calcificates in the walls of vessels, and that will be a step forward to finding an effective method of diagnosis and treatment of vascular calcifications.

BIOGRAPHICAL SKETCH AND SCIENTIFIC WORK

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Camillo Golgi was born in July 1843 in Corteno, a village in the mountains near Brescia in northern Italy, where his father was working as a district medical officer. He studied medicine at the University of Pavia, where he attended as an 'intern student' the Institute of Psychiatry directed by Cesare Lombroso (1835-1909). Golgi also worked in the laboratory of experimental pathology directed by Giulio Bizzozero (1846-1901), a brilliant young professor of histology and pathology (among his several contributions, Bizzozero discovered the hemopoietic properties of bone marrow). Bizzozero introduced Golgi to experimental research and histological techniques, and established with him a lifelong friendship.

Golgi started his scientific career in 1869, with an article in which, influenced by Lombroso's theories, he stated that mental diseases could be due to organic lesions of the neural centers. In 1872, due to financial problems, Golgi had to interrupt his academic commitment, and accepted the post of Chief Medical Officer at the Hospital and continued his search for a new staining technique for the nervous tissue. In 1873 he published a short note ('On the structure of the brain grey matter') in the *Gazzetta Medica Italiana*, in which he described that he could observe the elements of the nervous tissue "studying metallic impregnations... after a long series of attempts". This was the discovery of the "black reaction" (*reazione nera*), based on nervous tissue hardening in potassium bichromate and impregnation with silver nitrate. Such revolutionary staining, which is still in use nowadays and is named after him (Golgi staining or Golgi impregnation) impregnates a limited number of neurons at random (for reasons that are still mysterious), and permitted for the first time a clear visualization of a nerve cell body with all its processes in its entirety.

In 1875 Golgi published, in an article on the olfactory bulbs, the first drawings of neural structures as visualized by the technique he had invented. In 1885, Golgi published a monograph on the fine anatomy of the central nervous organs, with beautiful illustrations of the nerve centers he had studied with his method.

In the same year, Golgi returned to Pavia, where he was appointed in 1876 as Professor of Histology. In 1881 Golgi was appointed to the chair of General Pathology at the University of Pavia, and he also maintained his teaching in histology.

In Golgi's laboratory, Emilio Veratti (1872-1967), described for the first time the sarcoplasmic reticulum in skeletal muscle fibers. In 1906 Golgi shared the Nobel Prize with Santiago Ramón y Cajal (1852-1934) for their studies on the structure of the nervous system.

He took an active part in public life; he was especially concerned with public health, and became a senator in 1900. He retired in 1918 but remained as professor *emeritus* at the University of Pavia. Golgi died in Pavia in January 1926. His publications are collected in the*Opera Omnia* (published by Hoepli Editore, Milan). The first three volumes of*Opera Omnia* appeared in 1903 and the fourth volume was edited by Golgi's co-workers (L. Sala, E. Veratti, G. Sala) and appeared in 1929.

Scientific Debates and the Impact of Golgi's Discoveries

Golgi's discovery of the black reaction and his subsequent investigations provided a substantial contribution to the advancement of the knowledge on the structural organization of the nervous tissue. The theory that tissues are composed of individual cellular elements (the cell theory) had been enunciated in 1838-1839 by Matthias Jacob Schleiden (1804-1881) and Theodor Schwann

(1810-1882), but had not been extended to the nervous tissue. However, Golgi believed that his own observations of ramified nerve fibers could support the 'reticular theory', which postulated that the nervous system was a syncytial system, consisting of nervous fibers forming an intricate network, and that the nervous impulse propagated along such diffuse network. In the meantime, the theory that the nervous system as the other tissues was composed of cells, which were christened as 'neurons' by Wilhelm Waldeyer (1836-1921) in 1891, was receiving wide support, also from studies pursued in other laboratories by means of the Golgi's new staining. Cajal was the main supporter of the 'neuron theory', which correctly interpreted the nervous system as composed of anatomically and functionally distinct cells, not in cytoplasmic continuity.

Golgi described the morphological features of glial cells (that are also impregnated by his staining) and of the relationships between glial cell processes and blood vessels. He also described two fundamental types of nerve cells, still named after him as neurons 'Golgi type I', extending their axons at a distance from the cell body (the 'projection neurons' of the modern nomenclature), and 'Golgi type II', with axons ramifying in the vicinity of the cell body (corresponding to the 'local circuit neurons' and 'interneurons' of the modern nomenclature).

Among his other discoveries, in 1878 Golgi described the tendinous sensory corpuscles that bear his name (the Golgi tendon organs). In the years 1886-1892, Golgi provided fundamental contributions to the study of malaria: he elucidated the cycle of the malaria agent, the Plasmodium, in red blood cells, and the temporal coincidence between the recurrent chills and fever with the release of the parasite in the blood. Golgi also studied the efficacy of the administration of quinine during the disease.

In 1897, studying the nervous system with his black reaction, Golgi noticed in neurons an intracellular structure, whose existence he officially reported in April 1898. This structure was designated by Golgi "internal reticular apparatus" and was soon named after him as Golgi apparatus (or much later as the Golgi complex and is frequently referred to nowadays only as "the Golgi"). The discovery of this cell organelle was a real breakthrough in cytology and cell biology. However, the existence of the Golgi apparatus was debated for decades (many scientists believed that it only represented a staining artefact) and was only confirmed in the mid-1950s by the use of the electron microscope. The Golgi apparatus plays a key role in the intracellular sorting, trafficking and targeting of proteins. This organelle makes Golgi the most frequently cited scientist in cell and molecular biology.

Golgi left a heritage of passionate studies that exerted a profound influence on biomedical research in the 20th century.

THE PRODUCTS OF TECHNICAL MICROBIOLOGY - A PROMISING SOURCE OF PROTEIN AND ESSENTIAL AMINO ACIDS

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The rapid economic development of Asian countries at the beginning of the 21st century, specifically within its southeastern region, highlight that the inhabitants of Earth can create a lot of problems related to the increasing need for food within the population in the near future. Increasing the well being of the population of a country is always accompanied by an increasing level of food consumption. The increasing amount of food consumption in populous Asian countries, such as China and India, can quickly lead to shortages. This will be the beginning of a food crisis. An increased demand for protein products then follows. Everyone knows the relationship: the more protein consumption in the diets of people correlates to the development of the economy; through the development and implementation of technology.

Currently, the demand on the traditional sources of food reached its peak in the late 20th century, and further intensification of crop production or legumes can only lead to the degradation of one or another, in the agricultural area.