Hungarians in the History of Medical Sciences

Pharmaceutical Industry: The Beginnings

The first modern pharmaceutical laboratory in Budapest was established by Daniel Wagner in his Nádor Pharmacy. Wagner was born in 1800 and was among the first Hungarian graduates of chemistry at the Vienna University. He soon founded Pest Chemical Factory which later Hungaria Chemical Works. As a researcher he worked out various methods to trace arsenic poisoning and also experimented about producing artificial mineral waters.

Hungary’s pharmaceutical industry was established by Gedeon Richter (1872-1944). Richter spent several years abroad and started industrial-scale manufacturing of pharmaceuticals in the laboratory of his Sas (“Eagle”) Pharmacy in 1901. Initially, reflecting the medical trends of the time, his attention focused on organotherapic formulas: active agents of animal organs. Just one year after a Japanese researcher first managed to isolate adrenaline from the medullary substance of the adrenal, Richter launched its original formula of Tonogen solution containing adrenaline - a formula still used in medicine. His factory in Kőbánya, Gedeon Richter Pharmaceutical Factory, Hungary’s first pharmaceutical plant, started to operate in 1907 and has been in operation at the same site ever since. In addition to producing organotherapic formulas, the factory also became involved in the industrial processing of herbs and, by extracting active ingredients, it produced more reliable and precisely portioned preparations. Digitalis used in cardiotherapy and ergot derivates applied in obstetrics are examples of this line. The factory also dealt with the production of organochemical preparations. Several of these products are still being manufactured including Hyperol, a disinfectant tablet or Kalmopyrin a very popular drug and a strong competition to Aspirin. The factory was the first to launch large-scale production of pepsin.
The company’s development continued despite the Great Depression of the 1930s. By 1932, Richter had more than 32 patented products; it operated three branches abroad and 40 representative offices. More than 300 people worked under the control of pharmacists and three chemical engineers. Within the next five years production grew by 60%. Richter also introduced the production of sulphonamids, synthetic hormones and effective liver preparations.

In 1910, two of Richer’s chemical engineers Emil Wolf (1886-1947) and György Kereszty (1885-1937), left the company to establish their own business Chinoin Pharmaceutical Factory. Chinoin’s first success was Yohimbin, an aphrodisiac containing yohimbin alkaloids and testis extract.

Chinoin’s first internationally recognised product was a dermatological medicine called Cadogel. To speed up and modernise production, the company purchased several licenses from the German drug manufacturer Bayer.

Another boost to Chinoin’s international renown was a new veterinary product called Distol, an effective remedy against liver rot, a dangerous and ravaging disease of sheep.

By 1918, more than 1000 workers and nearly 100 white-collar employees worked in the factory. Chinoin’s new preparations included Sevenal, Troparin, Albroman and Neomagnol, popular drugs even today. Chinoin introduced industrial-scale manufacturing of papaverin, a synthetic product of Vitamin C.

The Hungarian subsidiary of the Swiss Albert Wander AG, Dr. Wander’s Works started to operate in the early years of the century. It specialised in making food preparations and earned international recognition with its leading products: Hordenzym, a breakthrough medicative nutrient for babies and Ovomaltine, which has remained a world-famous brand ever since. In 1932, the factory’s research laboratory isolated pure chelidonin alkaloids, and an original process resulted in the launching of Ronin, the first heterocyclical sulphonamid preparation.

After World War II, the company was nationalised and, through a series of mergers, transformed into a large state-owned company called “EGIS United Pharmaceutical and Food Factory”.

The Chinoin in the 1930s
The Alkaloida factory was founded by pharmacist János Kabay (1886-1936) in 1927. In 1925, Kabay discovered how morphine could be extracted from green poppy (Papaver) and tried to exploit this discovery in his new business. Kabay designed all instruments and the entire technological process. The factory developed rapidly and by the early 1930s a large part of the morphine production was exported. Kabay, however, could not reap the rewards of his discovery: he died of erysipelas in the age of 39.

Phylaxia Serums Co. Ltd. was established in 1912, and the factory’s name soon became well-known across Europe when it started marketing its sera and vaccines against swine-pest, swine erysipelas, glanders and splenic fever.

Hungarian Giants of Medical Science

Dávid Gruby (1810-1898)

The son of a poor shopkeeper, Dávid Gruby pursued his medical studies in Budapest and Vienna. Starting in 1840, Gruby worked in Paris as a researcher at the Veterinary High School of Alfort. His research first focused on various forms of mycosis. He published a series of articles with important findings on stomatomycosis and, later, on the anaesthetic effects of ether and chloroform. As a general practitioner Gruby soon became a popular family doctor of French artists: his patients included Dumas, Balzac, Heine, Chopin, George Sand, Liszt and Thomas. During the Paris Commune he was an ardent supporter of the revolution. Gruby was elected member of the Academy of Vienna and his publications appeared in leading medical journals.

Ignác Semmelweis (1818-1865)

Semmelweis started legal studies in Vienna but his interest soon turned to medical sciences and he attended medical classes at the university from 1837. After graduation he began to work at the maternity hospital of Professor Klein in Vienna. As a practicing obstetrician, he was puzzled by the high mortality of women due to “post-partum fever”. Semmelweis wanted to find the reasons for the mysterious disease. Like most of the young doctors, he often performed autopsies. After the postmortems he washed his hands and moved to the obstetrician ward to examine pregnant women or women under quarantine. He suspected that an ordinary hand-washing might not be enough to remove toxic particles that got on his hands during autopsies. Semmelweis suggested that those performing autopsies should scrub their hands with chlorine water and a brush. He became obsessed with the idea and his aggressive methods lead to fierce conflicts with his colleagues and superiors.
In 1950, Semmelweis moved to Budapest and became the chief doctor of Rókus Hospital. In 1855, he was appointed the professor of gynecology and obstetrics at the Budapest University. Statistics fully justified his hygienic reform: mortality due to post-partum fever dropped drastically.

Nevertheless, only a few of Europe’s leading medical professors accepted his unorthodox ideas and sepsis continued to kill scores of young mothers. Semmelweis could not come to terms with his failure to influence medical society. He became increasingly quarrelsome and started to exhibit bizarre behaviour. He was transferred to the psychiatric institute in Vienna where he soon died.

Endre Högyes (1847-1906)

Högyes started medical studies in Budapest and pursued research as professor of physiology at the university of Kolozsvár (today Cluj, Romania). His research focused on the organs of balance, particularly on the relationship between balancing and eye movements. Högyes made revolutionary discoveries of the complex nerve tracks of reflex functions.

He became professor of general physiology and therapeutics of the Budapest University in 1883. Högyes was assigned to test Pasteur’s antirabies vaccine. After three years of tedious research and experiments Högyes presented an original, upgraded method of vaccination whose results were better than that of Pasteur. In 1890, Högyes became head of the Pasteur Institute in Budapest. The Institute produced outstanding scientific results, many of which were documented in foreign languages as well. These publications earned international recognition for Högyes. His “dilution” vaccination method was adopted and applied with excellent results by other Pasteur Institutes all over the world.
Róbert Bárány (1876-1936)

After completing his medical studies at Vienna University in 1900, Bárány became a demonstrator at the Vienna Otological Clinic under Professor Politzer. Dealing with the physiology and pathology of the human vestibular apparatus, he made a surprising discovery: “When I rinsed my patients’ ears they often complained about dizziness. I also noticed that many developed a certain type of nystagmus...” He found that the type of dizziness varied if hot or cold water was used for ear rinsing. Bárány also observed that apart from the nystagmus, the heat stimulus also produced regular reactions in the muscular system of the whole body, and these also depended on the body posture and the position of the canals of the internal ear. He even found that certain muscular reactions indicated the illness of certain areas of the cerebellum.

When World War I broke out, Bárány volunteered for the front and was assigned by the Austrian army to set up a ward at a war hospital. He worked out a unique method of treating bullet wounds of the cerebellum. In 1915 he became a prisoner of war and was transferred to a Russian prison camp. The same year Róbert Bárány received the medical Nobel Prize. Following the personal intervention of Prince Carl of Sweden on behalf of the Red Cross, he was released from the prisoner-of-war camp in 1916 and was presented with the Nobel Prize by the King of Sweden at Stockholm.

Bárány returned to Vienna the same year, but was bitterly disappointed by the attitude of his Austrian colleagues, who reproached him for having made only incomplete references in his works to the discoveries of other scientists, on whose theories they said his work was based. These attacks resulted in Bárány leaving Vienna to accept the post of Principal and Professor of an Otological Institute in Uppsala, where he remained for the remainder of his life.

Béla Issekutz (1886-1979)

Issekutz obtained a diploma of medical science and worked first at the university of Kolozsvár (now Cluj, Romania) and later at the city’s pharmacological institute. In 1937, he became professor of the Budapest university and he worked here until retirement. His professional carrier is marked by several significant discoveries. In 1917, Issekutz experimented with atropine and proved that certain ingredients may reduce atropine’s effect on the central nerve system, while increasing the “parasympathicolitical” effect. These experiments resulted in the formulation of Novatropine which is a preparation in extensive use. Issekutz helped Chinoin to produce a new type of organic diuretics, Novurit in 1927.
His pharmacological research brought outstanding results in several areas including the physiology of the thyroid gland and the action mechanism of the insulin. Issekutz’s most popular book, Prescribing Medicines, has been published several times. He became a corresponding member of the Hungarian Academy of Science in 1939, and a regular member in 1945. Issekutz received the Kossuth Prize, the highest state award, in 1952.

Albert von Szent-Györgyi (1893-1986)

Albert von Szent-Györgyi matriculated in 1911 and entered his uncle’s laboratory where he studied until he was called up for service in World War I. He served on the Italian and Russian fronts, gaining the Silver Medal for Valour, and was discharged in 1917 after being wounded in action. He completed his studies in Budapest and then went to Hamburg for a two-year course in physical chemistry at the Institute for Tropical Hygiene.

In 1920 he became an assistant at the University Institute of Pharmacology in Leiden, and from 1922 to 1926 he worked at the Physiology Institute, Groningen, the Netherlands. In 1927 he went to Cambridge as a Rockefeller Fellow, and spent one year at the Mayo Foundation, Rochester, Minnesota, before returning to Cambridge. In 1930 he obtained the Chair of Medical Chemistry at the University of Szeged and in 1935 he also took the Chair in Organic Chemistry. At the end of World War II, he took the Chair of Medical Chemistry at Budapest and in 1947 he left Hungary to settle in the United States where he was Director of Research, Institute of Muscle Research, Woods Hole, Massachusetts.

Szent-Györgyi’s early researches at Groningen concerned the chemistry of cell respiration. At Cambridge and during his early period in the United States, he isolated from adrenals a reducing substance, which is now known as ascorbic acid. On his return to Hungary, he noted the anti-scorbutic activity of ascorbic acid and discovered that paprika (capsicum annuum) was a rich source of vitamin C.

He received the Nobel Prize for his outstanding scientific work and discoveries in the field of biological combustion, of Vitamin C and the catalysis of fumaric acid.

In 1938 he commenced work on muscle research and quickly discovered the proteins actin and myosin and their complex. This led to a reproduction of the fundamental reaction of muscle contraction which formed the foundation of muscle research in the following decades. The preservation of biological material in glycerine, which has had extensive application including agricultural use in the preservation of sperm, has
resulted from his more recent work. He also developed the use of rabbit psoas muscle as an experimental material, published theories on the problems of energetics and investigated the regulation of growth and cell membrane potential, and the hormonal function of the thymus gland.

Szent-Györgyi, a member of many scientific societies, was a past president of the Academy of Sciences, Budapest, and a vice-president of the National Academy, Budapest. He was visiting professor at Harvard University in 1936 and Franchi Professor, University of Liçge, 1938. He received the Cameron Prize (Edinburgh) in 1946 and the Lasker Award in 1954. His many publications include Oxidation, Fermentation, Vitamins, Health and Disease (1939); Muscular Contraction (1947); The Nature of Life (1947); Contraction in Body and Heart Muscle (1953); and Bioenergetics (1957).

Georg von Békésy (1899-1972)

Georg von Békésy received his early education in Munich, Constantinople, Budapest, and Zurich and studied chemistry at the University of Berne. He was awarded his Ph.D. from the University of Budapest in 1926 for development of a fast method for determining molecular weight. Afterwards he worked primarily for the Hungarian Telephone and Post Office Laboratory in Budapest where his interests were directed towards problems of telecommunications. Eventually he examined the problem of how best to design a telephone earphone.

Research on this problem led to his 1928 discovery of the mechanical characteristics of neural transduction in the inner ear. One of Békésy's principal contributions was the development of anatomical techniques that allowed rapid, nondestructive dissection of the cochlea. This dissection was done under a low-power microscope using a special grinding mechanism operated in a water bath. Békésy was able to observe the traveling waves along the basilar membrane that were produced by sound. He observed the shape of these waves by stroboscopic examination of the motion of particles of silver which he sprinkled on the nearly transparent basilar membrane. Depending upon the frequency of the sound, the traveling waves achieved maximum amplitude in different locations.

In 1947, after a year in Sweden, Dr. Békésy went to the United States and worked at Harvard University where he developed a mechanical model of the inner ear with nerve supply (see figure), the nerve supply being represented by the skin of the arm. This model became a useful tool for his more recent investigations. Threatened by forced
retirement from Harvard, Dr. Békésy moved to the University of Hawaii in 1966. He was attracted by construction of a special laboratory for him and the prospect of closer contact with oriental culture. His research in Hawaii was partially sponsored by Hawaiian Telephone and was concerned with phenomena that were general properties of all senses.

Békésy was awarded the Nobel Prize in Physiology and Medicine in 1961 for his discovery and subsequent research arising from it. He was the recipient of the Leibnitz Medal of the Berlin Academy of Sciences (1937), the Academy Award of the Budapest Academy of Science (1946), the Howard Crosby Warren Medal, and the Gold Medals of the American Otological Society (1957) and the Acoustical Society of America (1961). Honorary doctorates (M.D.) were conferred on him by the Universities of Munster (1955) and Berne (1959).