

BIOGRAPHY OF ALBERT SZENT-GYÖRGYI*

Albert Szent-Györgyi was born in Budapest on September 16, 1893 from an old Transylvanian family. His father Miklós was a petty farmer, bailiff, his mother was the daughter of József Lenhossék, a university professor. Place of his childhood together with his brothers Pál and László, was the mansion of Kis-Kér near Buják, and Budapest. Between 1904 and 1911 he was student of the Presbyterian College in Lónyay Street of Budapest.

After graduation he entered the Medical Faculty of Péter Pázmány University of Budapest, where his uncle Mihály Lenhossék was the professor of Anatomy. His studies, however, were interrupted by the World War I. He was drafted in 1914 and attended medical service at the Military Hospital of Miskolc. In 1915 he was sent to the Russian front where he was wounded and granted leave in 1917. During the time of his recovery he managed to finish his studies and he was conferred the degree of doctor on June 9, 1917. On September 19 of the same year he married Kornélia Demény. After his complete recovery in 1918 he was ordered to the Italian front where he was working at the bacteriological laboratory of a military hospital for two weeks only up to November of 1918 when the Italian front collapsed.

Then he became assistant under Géza Mansfeld, the professor of the Department of Pharmacology of the recently founded Erzsébet University of Pozsony. A couple of months after Pozsony was annexed by Czechoslovakia, they lost their small property and the years of wandering followed with his wife and daughter Kornélia (Nelli) on his scanty maternal inheritance. In 1919 for few weeks he was conducting electro-physiological studies at the Physiological Department of professor A. Tsermak, from where he moved to Berlin to be the assistant of L. Michaelis (1919—1920). Since there was no possibility for a final assignment, he decided to go to the tropics. Therefore, he continued his research in bacteriology and chemistry at the Institute of Tropical Health of Hamburg in 1921—1922, then as a first assistant of Storm van Leeuwen professor of the Institute of Pharmacology in Leiden 1922—1923. His attention increasingly focussed on chemical processes underlying physiological phenomena and various pharmacological effects. Between 1923—26 upon the invitation of professor R. J. Hamburger he was privat-docent at the University of Groningen. During the four years of his first assignment there he started his studies on cell oxidation and in 1924 his experiments settled the dispute between O. Warburg and H. Wieland.

After the unexpected death of Hamburger he had to find a new job, therefore, in order to save his wife and daughter from uncertainty he sent them back to Hungary. For a short while he was working in London as visiting scientist of Medical Research Council.

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The invitation of F. G. Hopkins to Cambridge found him at the verge of desperation and distress. There he was working on a Rockefeller fellowship from 1926 to 1930. From different plants and animal adrenal gland he isolated Vitamin C, named hexuronic acid at that time. To provide larger amounts of that substance for his experiments, he spent one year at Mayo Clinic of Rochester (USA) upon the invitation of professor E. C. Kendall (1926–27). There he managed to isolate 25 g hexauronic acid from the material obtained from the huge butchereries there. He took the substance back to Cambridge where the degree of doctor in chemistry was conferred on him in 1927.

In the meantime the Medical Faculty of Ferencz József University of Szeged, upon the recommendation of Kunó Klebesberg Minister of Cultural Affairs, decided offer professorship to Albert Szent-Györgyi in May 25, 1928. The Minister of Cultural Affairs assigned him professor of Department of Medical Chemistry with the decree No 73519/1928 V. K. During his first visit to Szeged Albert Szent-Györgyi took his oath of office on September 28, 1929 then returned to Cambridge for two years leave of absence, during which professor Béla Issekutz acted as his proxy.

On September 26, 1930 Szent-Györgyi took his university chair after all and moved to Szeged with his family. The young 37-year-old scientist of international note was accepted in Szeged with high expectation and appreciation. As soon as 1931 he became the president of the Research Committee of Natural Sciences and received several invitations to deliver lectures abroad.

He continued his world famous studies on hexuronic acid started in Groningen and continued in Cambridge. In November of 1931 it was proved that the substance called ascorbic acid by then, is identical with Vitamin C. In his lecture "Vitamin C, Adrenalin and Adrenal Gland" delivered at the meeting of Royal Medical Society of Budapest, held on March 18, 1932 he announced: "It is the first time we state in public, that hexuronic acid (ascorbic acid) and Vitamin C are identical". The announcement confirming the priority was then published in *Orvosképzés* (Hung.) (March, 1932) and *Orvosi Hetilap* (Hung.) (March 26, 1932). Paper of C. G. King and W. A. Waugh was published in *Science* (April 1, 1932), while Szent-Györgyi published his paper in *Nature* (April 16, 1932).

Fortunately Szent-Györgyi found large amounts of Vitamin C in the characteristic product of Szeged region, the paprika. Thus within a short time he managed to isolate three-and-a half kg crystalline substance at a relatively low cost. True to his personality, he immediately distributed it to all his research colleagues studying the same subject. As a new product of the Canning Factory of Szeged, a paprika pulp the Vitaprix appeared in market, which later was the basis of a new Vitamin.

Szent-Györgyi together with István Ruzsnyák professor in internal medicine isolated from paprika a substance belonging to flavonoids, which arrests the increased permeability of blood vessel walls characteristic of certain type of hemophilic diseases. Regarding the impact of the substance on permeability of walls of blood vessels, it was called Vitamin P.

Szent-Györgyi's reputation was indicated by the numerous international invitations and acknowledgements. He was member of Société Philomatique of Paris and the Karl-Ludwig Academy of Halle, invited professor of the Harvard University of Boston, member of the Société de Biologie of Paris, the Biologische Gesellschaft, Duodecim Society of Finland and Yugoslavian Medical Society and was acknowledged with several honors and decorations, among the others with Corvin wreath

and chain in Hungary. From May 16, 1935 he was corresponding member and from May 6, 1938 full member of the Hungarian Academy of Sciences.

On October 28, 1937 the Karolinska Institute of Stockholm awarded the medical Nobel Prize to Albert Szent-Györgyi "for his discoveries in biological oxidations with special regard to Vitamin C and Fumaric acid catalysis". The scientific acknowledgement bringing our country among Nobel prize winner nations initiated a series of celebrations. On December 1, he was honoured as freeman of Szeged, and "Honoris causa" doctor of Ferencz József University of Szeged on April 7, 1938.

He delivered numerous lectures both in Hungary and abroad (Sweden, England, France, USA), was honoured with several decorations ("Honoris causa" doctor of Sorbonne of Paris, medal of the Yugoslavian Saint Sava order, 2nd Cross of Lipot the 2nd in Belgium, membership of Hungarian Upper House). In September–October 1938 he had a lecture tour in the USA from where he returned without his wife. His daughter continued her studies first in Cambridge then in Switzerland.

Albert Szent-Györgyi had a significant role in the reform of medical training as university lecturer as well, he fought for the existence of medical faculty in Szeged. As dean and prodean he invested great effort in developing medical training and research as well as in democratization of the university. He had particularly important role in 1940–1941 when the Ferencz József University moved back to Kolozsvár and he became the Rector of Miklós Horthy University in Szeged. His efforts to establish a modern democratic atmosphere at the university and a democratic youth organization, were temporarily successful in that serious political period. His suggestions for reforming secondary and university training were audaciously pointing forward.

With the intention of a permanent stay he bought a cottage in New Szeged in 1941, married Márta Borbíró and called his daughter back from Switzerland.

During his research work he gathered a number of enthusiastic talented researchers around himself (Ilona Banga, Tamás Erdős, Mihály Gerendás, Kálmán Laki, Brunó F. Straub, Ferenc Guba), and with them he got into the forefront of international biochemical research through clarifying the role of actomyosin and ATP. Results of that research work was reviewed in the *Studies from the Institute of Medical Chemistry (Vol. of 1942)* in joint publication of Ilona Banga and Albert Szent-Györgyi. Applying the method suggested by O. H. Warburg they studied the oxygen uptake of muscle tissues. Without his discoveries on tissue respiration H. A. Krebs could not have discovered citrate cycle, which after all has been called Szent-Györgyi – Krebs cycle.

He received invitations for lecturing from all over the world. He became "Honoris causa" doctor of University of Padova and University of Lausanne. In his own country, however, he became persecuted. From 1941 on he was increasingly attacked for his progressive ideas by the right wing press. An antifascist movement bearing his name started acting in 1942 under his leadership. He negotiated with the British about Hungary's break away from the war. Hitler demanded his extradition. He had to find shelter in order to save his life. In that critical time he reviewed his results in studies on muscle. The review entitled "Studies on Muscle" was published in 1945.

Albert Szent-Györgyi did not rely upon the Hungarian publication, so he sent a copy of the manuscript to Stockholm, which appeared as a supplement of *Acta Physiologica Scandinavica* in 1945. On the cover of the supplement it can be read that Albert Szent-Györgyi was granted with the citizenship of Sweden.

On February 9, 1945 he visited Szeged again but from April 27 he was appointed Professor of Biochemistry in the Medical School of University of Budapest. In 1945 he was the honorary chairman of the Society of National Aid which was to fight against the post-war social misery. As elected president of the National Council for Public Education he was working on democratizing the educational system. Together with Lajos Zilahy, the writer he was co-president of the Hungarian-Soviet Cultural Society, and full president of the Academy of Natural Sciences. In 1946 he was member of the Presidium of Movement for establishing Popular Colleges, and a promoter of the movement of "Science for workers and workers for science". He was together with Zoltán Kodály vice president of the Hungarian Academy of Sciences reorganized on July 28, 1946 and patron of the movement organizing popular libraries in 1947.

For his activities in the antifascist movement he got the silver medal of Hungarian Liberty Order and the Kossuth Prize together with his two former co-workers Kálmán Laki and Bruno F. Straub on March 15, 1948.

That time he was in the USA but he did not return since it became obvious that the break between the allied antifascist powers of the World War II was final. Sometimes he had been warned by hints indicating the atmosphere of mistrust. The arrest of his friend and comrade in antifascist resistance and intellectual restoration confirmed his decision. He did not return but stayed in the USA.

From 1948 he continued his studies on biochemistry of muscle having started in Szeged as the director of the Institute for Muscle Research of the Laboratory of Marine Biology. His interest was increasingly focussed at the submolecular life processes founding thereby, as later disclosed, two new fields of sciences, the submolecular biology and bioenergetics. His book entitled "Bioenergetics" published in 1957 is a landmark in science.

In 1954 he was awarded with the Albert Lasker prize of the American Cardiological Society and obtained American citizenship in 1955.

In 1960 he started to study thymus so as to get better knowledge in regulation of cell division. That led him to cancer research having been prompted also by personal initiatives: two of his dearests, his second wife and daughter died of cancer leaving him and his three grandchildren behind.

Discovery of atom- and hydrogen bombs threatened the world with a new war in the sixties. Several American scientists with Albert Szent-Györgyi among them protested against the Vietnam war in books, articles and personal communications. Albert Szent-Györgyi proclaimed his Hymn for the Peace on a record and sent it all the leading politicians of the world. His trilogy summing up his political, social and scientific views was published in sequence: *The crazy ape* (1970), *What next?!* (1971), *The living state. With observation on cancer.* (1972). Governmental support of his research was first reduced then stopped which he protested in public. To support his research in 1975, a wealthy couple Franklin and Tamara Salisbury established the National Foundation for Cancer Research. The "Laboratory Free-of-Walls" became a system of international exchange of scientific information from 14 countries.

In 1976 he married Marcia.

From 1948 the Hungarian socialist system showed a reproaching then concealing behavior towards Szent-Györgyi. A change occurred later during the political struggle of Szent-Györgyi and the international circumstances. "Contemplations of a biologist" was published in Hungarian in 1970, and on December 25 of the same year he was on the programme of "Our Mother Land" on the Hungarian Radio. After that a series of his articles and books were published in Hungarian.

He visited Hungary after two-and-a-half decade on October 7, 1973. He was

conferred the “Honoris causa” doctor’s degree on October 12 at the University of Medical Sciences of Szeged and honorable member of World Society of Hungarians on October 16 of the same year.

Outstanding scientists and friends greeted the 90-year-old scientist decorated with the Rubins decorated Order of the Hungarian People’ Republic.

He died on October 22, 1986 at age of 93, and was buried on October 26 in Woods Hole close friends being present only.

On December 10, 1987 – on the 50th anniversary of his Nobel Prize Award – the Medical University of Szeged took the name of its used to be Dean and Rector Albert Szent-Györgyi, and unveiled his bust in the Pantheon of immortals of Nation next to the door of his Department in Dom square.