Albert Szent-Györgyi

Budapest, Hungary, 16 August 1893 – Woods Hole, Mass, USA, 22 October 1986

Title Professor of Biochemistry, National Foundation for Cancer Research, Woods Hole, MA, USA. Nobel Laureate in Physiology or Medicine, 1937

Nomination 10 April 1970

Commemoration – On Saturday October 25th, 1986, the day before yesterday, the Pontifical Academy of Sciences lost one of its most imaginative, most creative, and most non-conformist members, Albert SzentGyorgyi.

He died shortly after having reached his 93rd birthday, after having lived a long and colourful life, rich in scientific adventure, in success and in controversy. Szent-Gyorgyi's life was one of unrest, due both to scientific and to political challenge. He was born in Budapest, in Hungary, on the 16th October 1893. He got his Doctor's degree in Medicine at the University of Budapest In 1917. As a medical student, he first engaged in research in histology, but slowly turned to physiology, to pharmacology, to physical chemistry and finally to biochemistry.

During World War I he had to join the army, and in 1917, when working in a bacteriological laboratory of the army, he revolted against atrocious instances of human experimentation and was sent to a swampy and malaria-stricken region in Italy. After the end of the war he started work at the University of Poszony, then Hungarian but soon after assigned to Czechoslovakia by the Treaty of Versailles. Szent-Gyorgyi passed from Czechoslovakia to Hungary, and shortly afterwards, deprived of all his property in those days of social and revolutionary upheaval, furtively returned to Czechoslovakia. He joined the electrophysiologist Von Tschermak in Prague, then moved to Berlin, then to Hamburg, before settling for two years at Leyden, Holland, as an Associate Professor at the pharmacological laboratory of the University.

From 1923 to 1926 he worked at the physiological laboratory of the University of Groningen, and from 1927 to 1932 as a Rockefeller fellow at the University of Cambridge, England. Returning to Hungary, Szent-Gyorgyi became Professor of Medical Chemistry at the University of Szeged.

During World War II, in Hungary, he soon got into trouble with Nazism, but after the end of the war, in 1947, when he assisted a friend of his who had been arrested, he got into political trouble again and he had to leave the country and moved to the United States, where he stayed and worked until his death, directing a laboratory in the Marine Biological Station in Woods Hole.

Now regarding his work: in the 20s, Szent-Gyorgyi engaged in research on biological oxidations and he immediately became involved in an acute controversy at that time between Wieland and Warburg on the mechanism of biological oxidations. He discovered the important role of C4 acids such as succinic acid, and the respective dehydrogenases such as succinic dehydrogenase, and he paved the way to the elucidation by Hans Krebs of the citric acid cycle.

When investigating oxidations in plant tissues, he detected a then unknown reducing agent which later turned out to be vitamin C, ascorbic acid. He then proposed the hazardous theory, on very little experimental evidence, that the same reducing agent might be present in adrenal glands. In fact, Szent-Gyorgyi subsequently succeeded in isolating and crystallizing the reducing agent, from oranges, from lemons, from cabbage and from adrenals.

During one year's stay at Rochester in the United States, he succeeded in isolating 25 grams of this mysterious substance from the adrenal glands. Later, in Hungary, having no adrenals at his disposal, on the occasion of a supper rich in paprika, he had the idea to test paprika for its vitamin C content, and indeed paprika turned out to be a veritable mine of vitamin C.

When Szent-Gyorgyi administered impure vitamin C to patients suffering from Purpura of Schönlein-Henoch, which involves capillary fragility and subcutaneous bleeding similar to bleeding in scorbutic patients, he was remarkably successful, but he failed using pure ascorbic acid. That is how Szent-Gyorgyi discovered the group of compounds called vitamin P which were impurities in the original vitamin C preparations and could be prepared from paprika.

Szent-Gyorgyi was then fascinated by a mysterious yellow, fluorescent, reversibly reductible compound which he called "cytoflavin" and which later became known as riboflavin, one of the most important vitamins. Later again, he was fascinated by the coenzyme of lactic dehydrogenase, his findings paving the way to the discovery by Warburg of the pyridine nucleotides.

Later, turning to more complex biological phenomena, Szent-Gyorgyi investigated muscle contraction. He discovered, together with his pupil Straub, actin and the contraction of actomyosine by ATP. The available molecular explanations of energy transformation in muscle contraction and in other biological systems, however, did not satisfy Szent-Gyorgyi. He advocated the extension of biology into the submolecular and supramolecular dimension. He particularly concentrated on the study of electron transfer reactions in living tissues, involving semi-conducting protein molecules. He considered bioelectronics to be the key to cellular processes and cellular regulations, and he finally proposed an electronic theory of cancer.

Szent-Gyorgyi was a biochemist and physiologist of worldwide reputation. He was awarded the Nobel Prize in Medicine in 1937, for the elucidation and discovery of the catalytic function of C4 dicarboxylic acids for his discovery of vitamin C. He received honorary Doctor's degrees from many universities and enjoyed the membership of the most renowned academic and scientific societies.

Szent-Gyorgyi never contented himself in making an interesting observation. Experimental findings induced him to put forward most ingenious and sometimes rather bizarre theories which were leading him, and more often other scientists, to great and most important discoveries. His later and most speculative theories, however, met with much skepticism. Nevertheless, Albert Szent-Gyorgyi has been one of the pioneers of modern biochemistry, always original, fascinating and challenging, one of the most imaginative and penetrating scientific minds and, moreover, a marvellous character, an exuberant personality.

He was a member of our Pontifical Academy since 1970. We shouldn't and we shall not forget him.

Hans Tuppy