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LUIS FREDERICO LELOIR - SOUTH AMERICA'S ONLY NOBEL PRIZE LAUREATE IN CHEMISTRY

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ABSTRACT

Luis Frederico Leloir, South America's only Nobel Laureate in Chemistry was born in Paris, France in 1906 and died in Buenos Aires, Argentina in 1987. He graduated as a physician from the University of Buenos Aires and was a student of Bernardo Houssay. With his own resources and help from his friends he founded in 1947 the Instituto de Investigaciones Bioquimicas (Fundación Campomar). He became famous for his research dealing with sugar nucelotides, bioynthesis of carbohydrates and oxidation of fatty acids. He was awarded the Nobel Prize in Chemistry in 1970.

RESUMO

Luis Frederico Leloir, o único Laureado do Prêmio Nobel em Química da América do Sul nasceu em Paris, França em 1906 e faleceu em Buenos Aires Argentina em 1987. Formou-se como médico na Universidade de Buenos Aires e foi aluno de Bernardo Houssay. Com recursos próprios e ajuda de seus amigos fundou em 1947 o Instituto de Investigaciones Bioquimicas (Fundación Campomar). Ficou famoso por seus trabalhos com nucleotídeos de açucares, biossíntese de carboidratos e oxidação de ácidos graxos. Em 1970 Leloir foi laureado com o Prêmio Nobel em Química.

Luis Frederico Leloir was born in Paris, France on September 6, 1906. His parents, members of a traditional family from the Provence were living in Europe at the time.

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When Leloir was two years old, his family moved definitely to Argentina and settled in Buenos Aires. They became very prosperous and were readily accepted as members of the high society of the Argentine Capital.

He grew up and did all of his formal studies in Buenos Aires. Leloir graduated as a physician from the University of Buenos Aires in 1932 and was awarded the Doctor of Medicine Degree two years later, in 1934. His doctoral thesis entitled " *Suprarenales e Hidratos de Carbono*" was done under the supervision of Bernardo Houssay, who in 1947 was awarded the Nobel Prize in Medicine and Physiology.

In 1935 Leloir went to England where he worked with Sir Frederic Gowland Hopkins (Nobel Prize in Medicine and Physiology of 1929) in the Biochemical Laboratory in Cambridge. After his return to Argentina in 1937, Leloir went back to work in the Instituto de Fisiologia directed by Houssay. In collaboration with Juan M. Muñoz he studied the oxidation of fatty acid. They obtained the first system of living cells that were able to oxidize fatty acids in vitro.

In subsequent studies in the same institute, in collaboration with Carlos Taquini, Juan C. Fasciolo and Eduardo Brown Menéndez dealing with renal hypertension, he discovered angiotensin, a protein responsible for the increase in arterial blood pressure.

In 1943 Luis Frederico Leloir went to the United States of America where he remained for a period of about three years and worked with Green and Cori. Upon his return to Argentina in 1947, with his own resources and help from friends and relatives and the industrialist Jaime Campomar, Leloir founded the Instituto de Investigaciones Bioquimicas. During its inauguration, on November 3, 1947 Leloir said the following prophetic words. "*El Instituto de Investigaciones Bioquimicas comienza sus actividades en un lugar pequeño y provisorio, pero esperamos que sean grandes su labor y su futuro*".("The Institute of Biochemical Research begins its activities in a small and temporary location, but we hope that its deeds and its future shall be great").

The founding members of the Institute together with leloir were Ranwell Caputto, Raul Trucco, Carlos E. Cardini and Alejandro C. Paladini. A picture of the original building on Julian Alvarez Street, Buenos Aires, where the Institute was housed from 1947 to 1958 is shown in Figure 2.

FIGURE 1. LUIS FREDERICO LELOIR AND HIS FAMOUS CHAIR.

FIGURE 2. BUILDING ON JUAN ALVAREZ STREET Nº 1917 IN THE PALERMO DISTRICT OF BUENOS AIRES WHERE THE INSTITUTO DE INVESTIGACIONES BIOQUIMICAS FUNCTIONED FROM ITS FOUNDING IN 1947 UNTIL 1958.

The first research work done in the new laboratory was the synthesis of lactose. This work was very complicated and involved a detailed study of the metabolism of glucose and galactose. It eventually led to the synthesis and discovery of the first sugar nucleotide, uridine diphosphate glucose (UDPG). The conversion of galactose 1-phosphate to glucose 1-phosphate is generally known in biochemistry as the "Leloir Pathway" and is illustrated in Figure 3. This and other interconversions of hexoses take place at the sugar nucleotide level and was unknown at the time. Leloir's studies led to the discovery of both UDP glucose and UDP galactose and to a Nobel Prize in Chemistry to be awarded almost a quarter of a century later in 1970. Subsequently, his group synthesized more than a dozen sugar nucleotides. Eventually Leloir, Carlos E.Cardini and the Peruvian scientist Jorge Chiriboga succeeded and discovered the enzymatic synthesis of sucrose.

In 1958, the Instituto de Investigaciones Bioquimicas moved to new facilities in a building located on Obligado Street Nº 2490 in Buenos Aires (Figure 4). The first discovery at the new location was the enzyme starch synthetase.

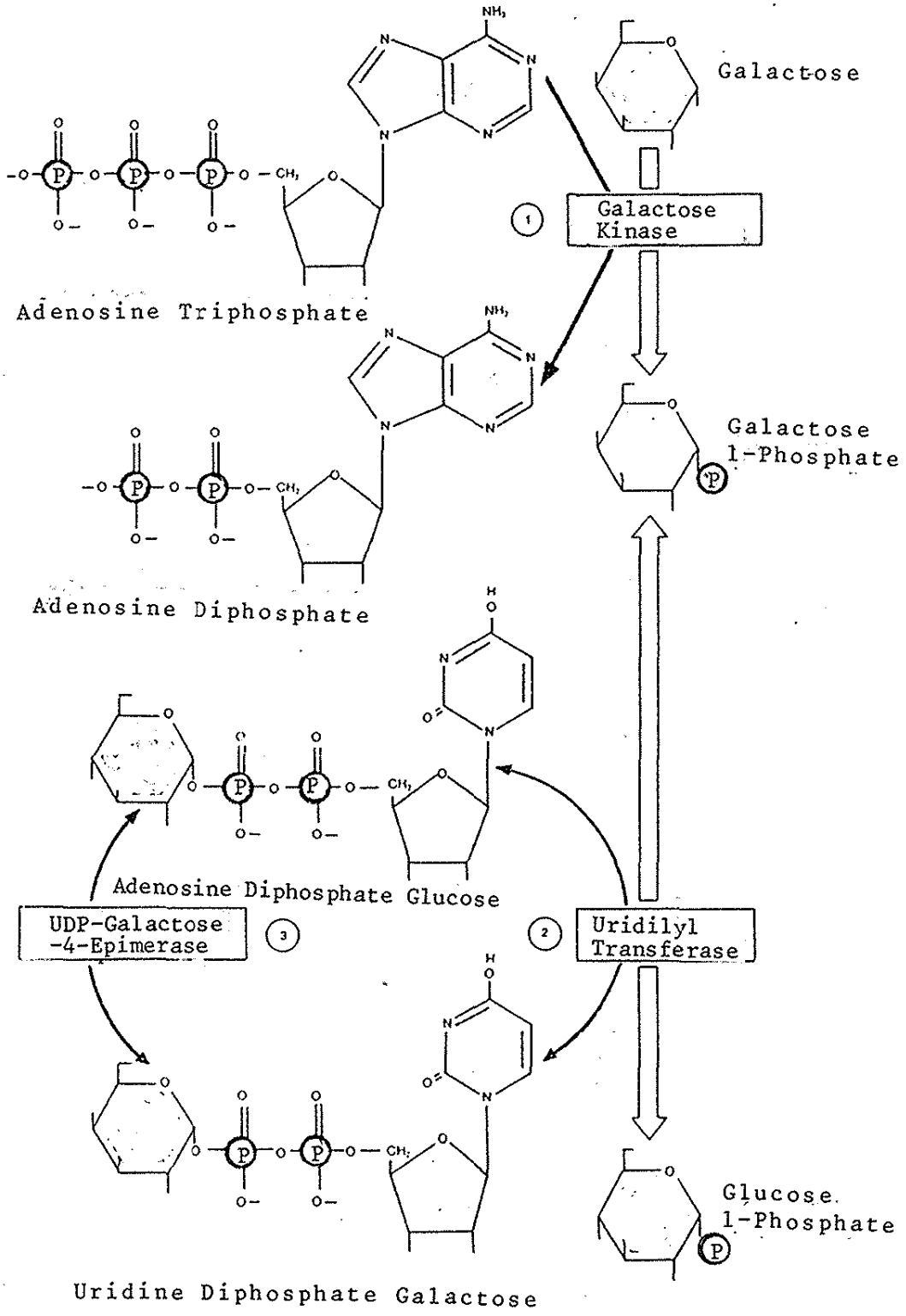
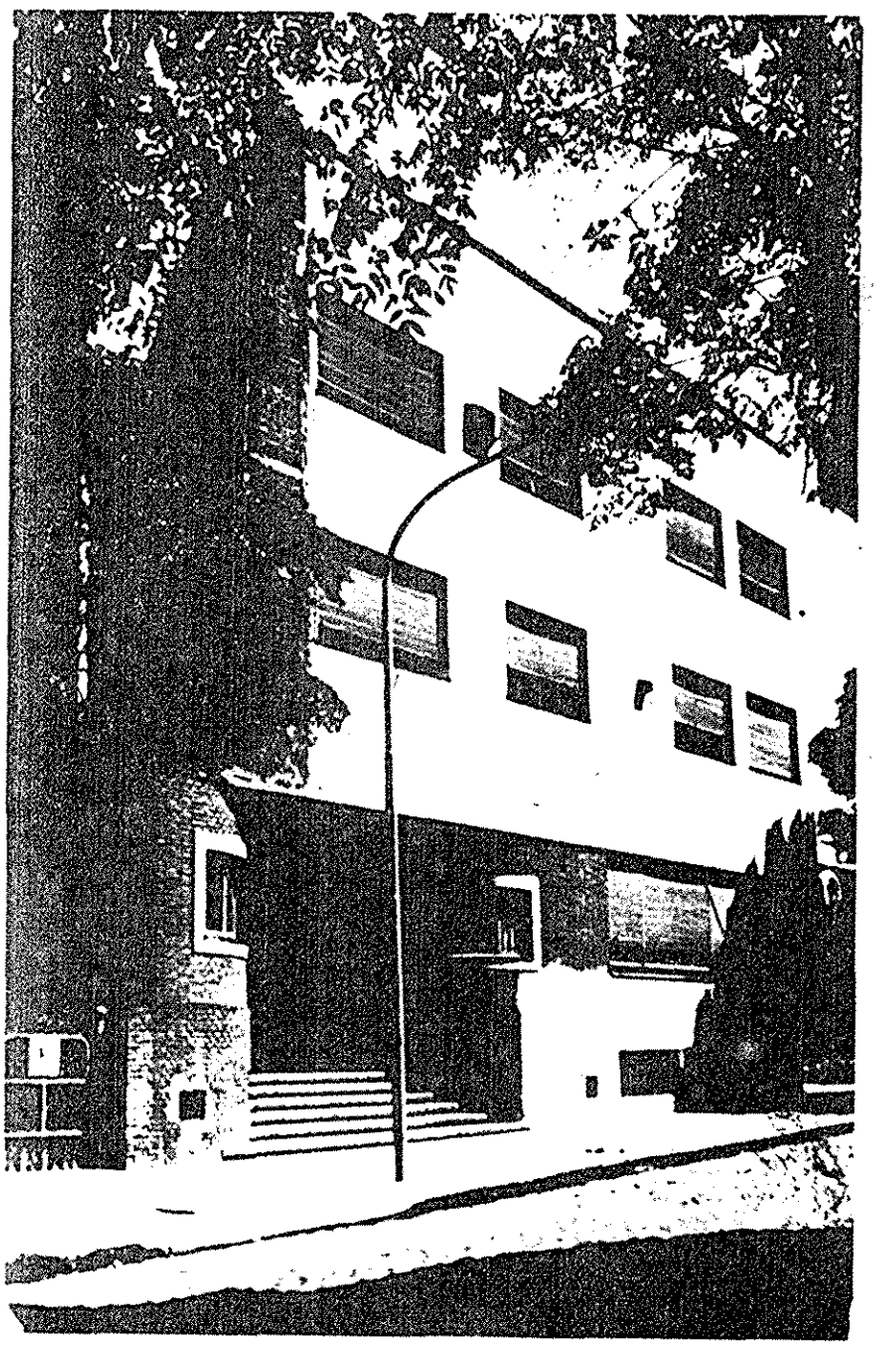


FIGURE 3. THE LELOIR PATHWAY.



FIFURE 4. NEW BUILDING OF FUNDACIÓN CAMPOMAR LOCATED ON OBLIGADO STREEET Nº 2490, BUENOS AIRES.

Other important contributions made by Leloir and his collaborators dealt with the synthesis of glycogen and the biochemistry of lipids.

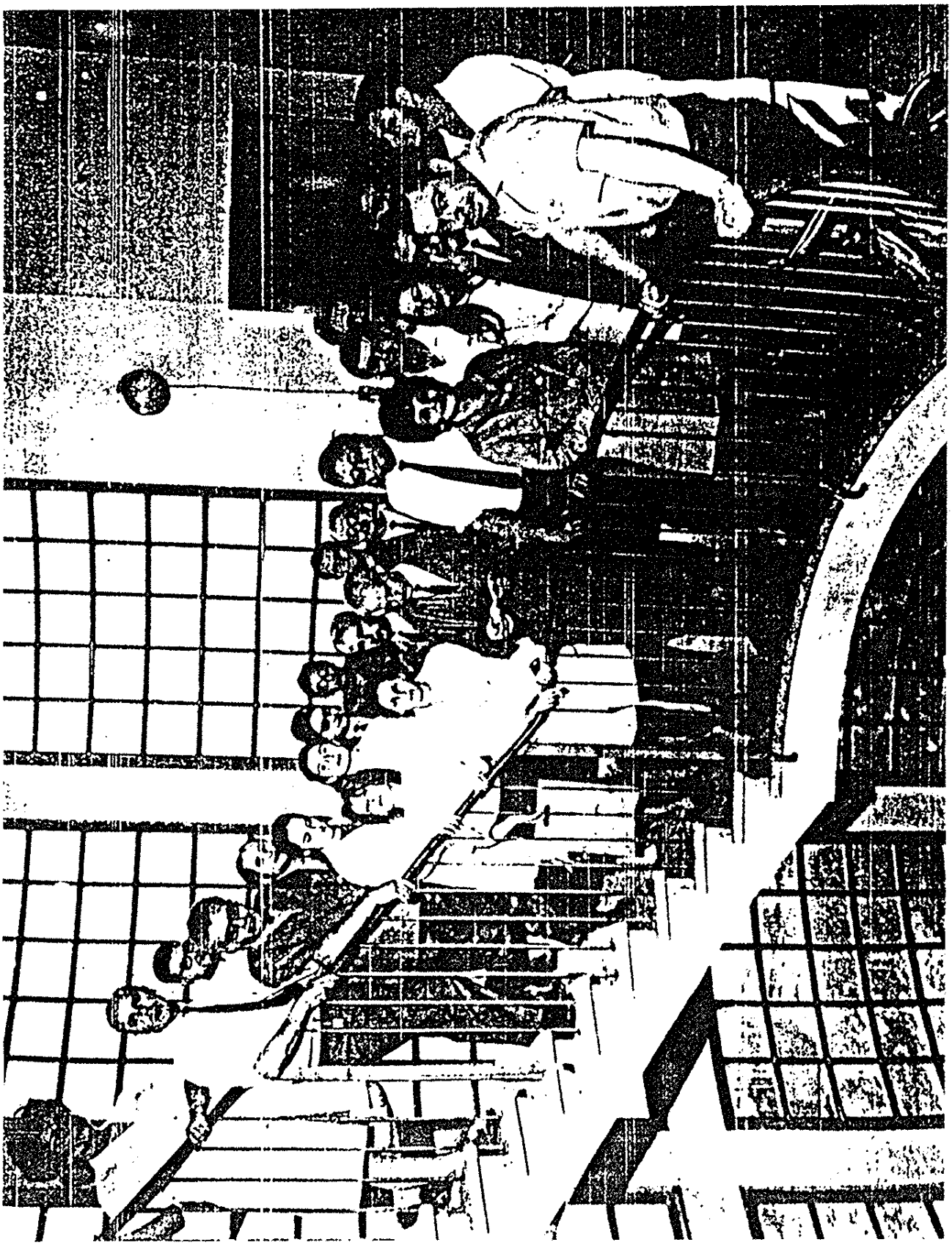


FIGURE 5. LUIS FREDERICO LELOIR AND SOME OF HIS COLLABORATORS AT FUNDACIÓN CAMPOMAR. (Prof. C. A. Perazzolo is the first one on the right.

On October 27, 1970 Luis Frederico Leloir was awarded the Nobel Prize in Chemistry, the first received by a Latin American chemist. Many years latesr, in 1995, a second Latin American, the Mexican chemist Mario Molina was awarded the Nobel Prize in Chemistry together with Paul Crutzen and F. Sherwood Rowland for their work dealing with the ozone layer.

Leloir was for many years the most respected scientist in Argentina and was a member of Argentina's elite. By marriage he became related to one of the richest and most influential families of Buenos Aires. In spite of all this, he led a modest life and worked on his research projects up to the very end. He used to drive a modest Fiat Seicento automobile and went to work every day to the Instituto de Investigaciones Bioquimicas taking his lunch box along. He dispensed fancy restaurants and preferred to eat lunch with his collaborators. He also liked to drink a glass of wine with all of his meals. One of his favorite things was his famous straw chair. Unlike many scientists in Latin America that are part of the select ruling class and are more interested in maintaining things as they are, Luis Frederico Leloir never forgot the social, ethical and moral responsibilities of a true scientist.

He died in Buenos Aires, Argentina at the age of 81, on December 2, 1987. His good example is alive among the chemists and biochemists of Argentina and his disciples in other countries and continents.

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